STEEL

The

Metalworking Weekly

AUGUST 8, 1960

A PENTON PUBLICATION

Profit Pinch to Hold in 2nd Half

Multiple Molds Cut Foundry Costs

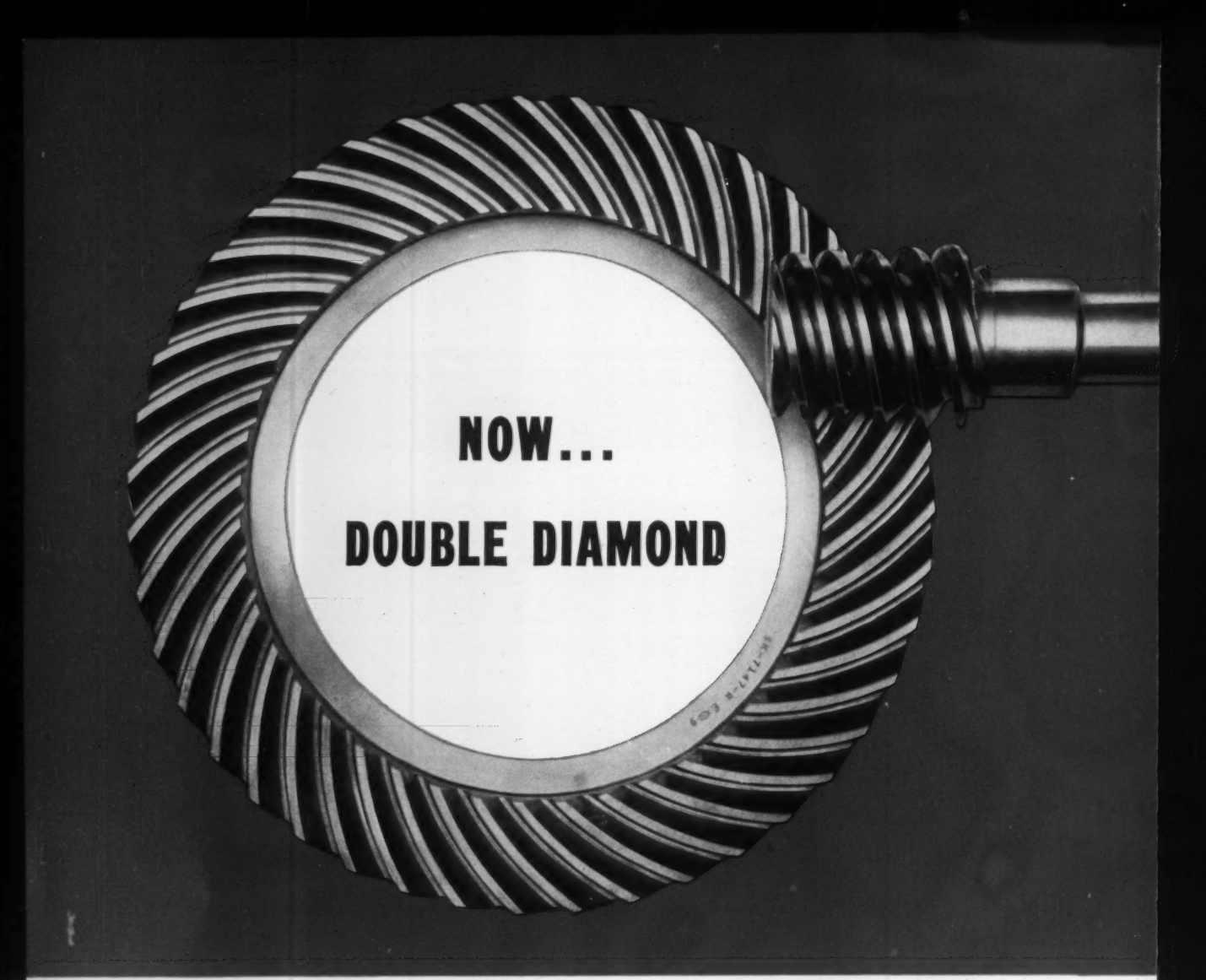
GE Devises Machining Profit Finder

Bearing Sales Roll Toward Record

CONTENTS—TURN PAGE

Magnesium Tugs At Demand Curve

Entry of a second producer, Alabama Metallurgical Corp., puts total U. S. capacity at about 90,000 tons. Almet's president, A. E. Petermann, and others are eying the auto industry as a prime target. Claims the industry: Use of magnesium lags its research and development. Plans to expand the metal's uses are described on Page 56



HIGH-REDUCTION BEVEL GEARS

To the nine gear types* already made by us for a long list of leading manufacturers, we now add High-Reduction Bevel Gears to meet a growing demand for the economy and speed reduction accomplished by this type of power transmission.

These DOUBLE DIAMOND High-Reduction Bevel Gears will supply speed reduction normally considered impractical in a single gear set of this type. In many cases they will replace more complex and more costly gear systems, thus improving design and achieving simplicity, while considerably lowering costs.

One of our gear engineers would be more than pleased to meet with you to discuss fully the interesting possibilities of this new member of the DOUBLE DIAMOND family.

EATON

AUTOMOTIVE GEAR DIVISION
MANUFACTURING COMPANY
RICHMOND, INDIANA

GEARS FOR AUTOMOTIVE, FARM EQUIPMENT AND GENERAL INDUSTRIAL APPLICATIONS
GEAR-MAKERS TO LEADING MANUFACTURERS

*Angular bevel gears, Helical gears, Spur gears, Flywheel ring gears, Hypoid bevel gears, Straight bevel gears, Spline shafts, Zerol† bevel gears, Spiral bevel gears. Also gear assemblies.

†REG. U.S. PAT. OFF.

This Week in

STEEL The Metalworking Weekly

August 8, 1960 Vol. 147 No. 6

Profit Pinch to Hold in 2nd Half

Metalworkers aren't sure how to call the profit trend for the second half. Brightening the outlook are: Better inventory balance, expected sales upturn, new products introduction. But higher costs, foreign competition, and price fighting will probably keep the squeeze on profits. PAGE 53

World Trader Becomes Top Name in Refractories

"Refractory metals have come of age," says K. C. Li Jr., vice president-operation of sales, Wah Chang Corp. Without hoopla, the company is making metallurgical history in that field. Its supplies of hafnium, columbium, tungsten, tantalum, zirconium, molybdenum, and tin are prodigious. It has developed its enviable record in two decades, since it became a wartime tungsten producer. Of all the refractory metals, Mr. Li believes columbium has the greatest potential. In the photo, he's pointing out Albany, Oreg., site of one of Wah Chang's many plants. PAGE 58

Cast Steel Components Benefit Fabricator, User

Redesign of equipment or machinery to use steel castings offers shortcuts to the fabricator and benefits the user, says the Steel Founders' Society of America. PAGE 88

GE Offers Machining Profit Finder

Hi-E (high efficiency) machining, a technique developed by production men at General Electric Co., has made it possible to reduce machining costs in some 40 GE departments by factors as large as 10:1, says Dr. W. W. Gilbert, manager of the firm's machining development service. "Their savings can now be measured in millions," he says. PAGE 92

Explosives Size Missile Warhead

In 0.001 second, this outer shell for a missile warhead was finish sized in a split die with an explosive charge. Parish Pressed Steel Div., Dana Corp., Reading, Pa., can turn out four parts an hour. It says forming rates are far beyond those obtained on regular equipment. Parish transmits the shock waves through water because it's simple and cheap. PAGE 99

Bearing Sales Roll Toward New Record

Makers of antifriction bearings are basing their hopes for a record year on the belief that 1960 auto production will exceed last year's by about 15 per cent. Automakers are the major consumers, taking about 40 per cent of annual production. Optimists predict a 15 per cent gain in shipments (1960 vs. 1959), while conservatives figure the gain will be closer to 5 per cent. PAGE 121

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Index available semiannually.

STEEL is also indexed by Engineering Index, 29 W. 39th St., New York 18, N. Y.

STEEL, the metalworking weekly, is selectively distributed without charge to qualified management personnel with administrative, production, engineering, or purchasing functions in U. S. metalworking plants employing 20 or more. Those unable to qualify, or those wishing home delivered copies, may purchase copies at these rates: U. S. and possessions and Canada, $10 a year; all other countries, $30 a year; single copies, 50 cents. Metalworking Yearbook issue, $2. **Published every Monday by The Penton Publishing Co., Penton Bldg., Cleveland 13, Ohio.** Accepted as controlled circulation publication at Cleveland, Ohio.

The redesign of this forging solved a machining problem

BEFORE: Forged on an upsetter, this cylinder presented minor machining problems for the customer. The forging had to be trimmed on the sides; this resulted in flat spots, uneven cuts. It was also difficult to keep the OD concentric with the bore.

AFTER: Made on a mechanical press, this cylinder offers a better surface for machining. Sides don't have to be trimmed, so there are no flat spots, no uneven cuts to worry about. No gripping collar, either. Concentricity of OD and bore is excellent.

Steel

for Strength
. . . Economy
. . . Versatility

In this case a mechanical press produced a better piece for the customer than an upsetter. But we know many cases where the opposite is true. One of the nice things about doing business with Bethlehem is knowing we'll recommend the one "right" method of manufacture the first time around. We have the experience, and the facilities (press, hammer, drop, and upsetter) to back up our recommendations. A chat with one of our design engineers costs you nothing . . . and may help to turn your problem into a profit. Our nearest sales office can arrange a meeting to suit you.

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Have a Metal Cleaning Problem

Detrex Engineers Have Been Coming Up With "Cost Saving" Answers for 30 Years

Every metal cleaning operation has its own particular problems—but they're seldom new to the Detrex engineer. With 30 years of experience, he can produce the right formula to insure maximum productivity and economy in your operation.

He will analyze your product, the type of soil to be removed, the proper equipment and cleaning agent needed, the space and manpower required—every factor that bears on the problem.

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Write for your free copy of Dr. C. E. Kircher's informative paper "Solvent Degreasing—What Every User Should Know."

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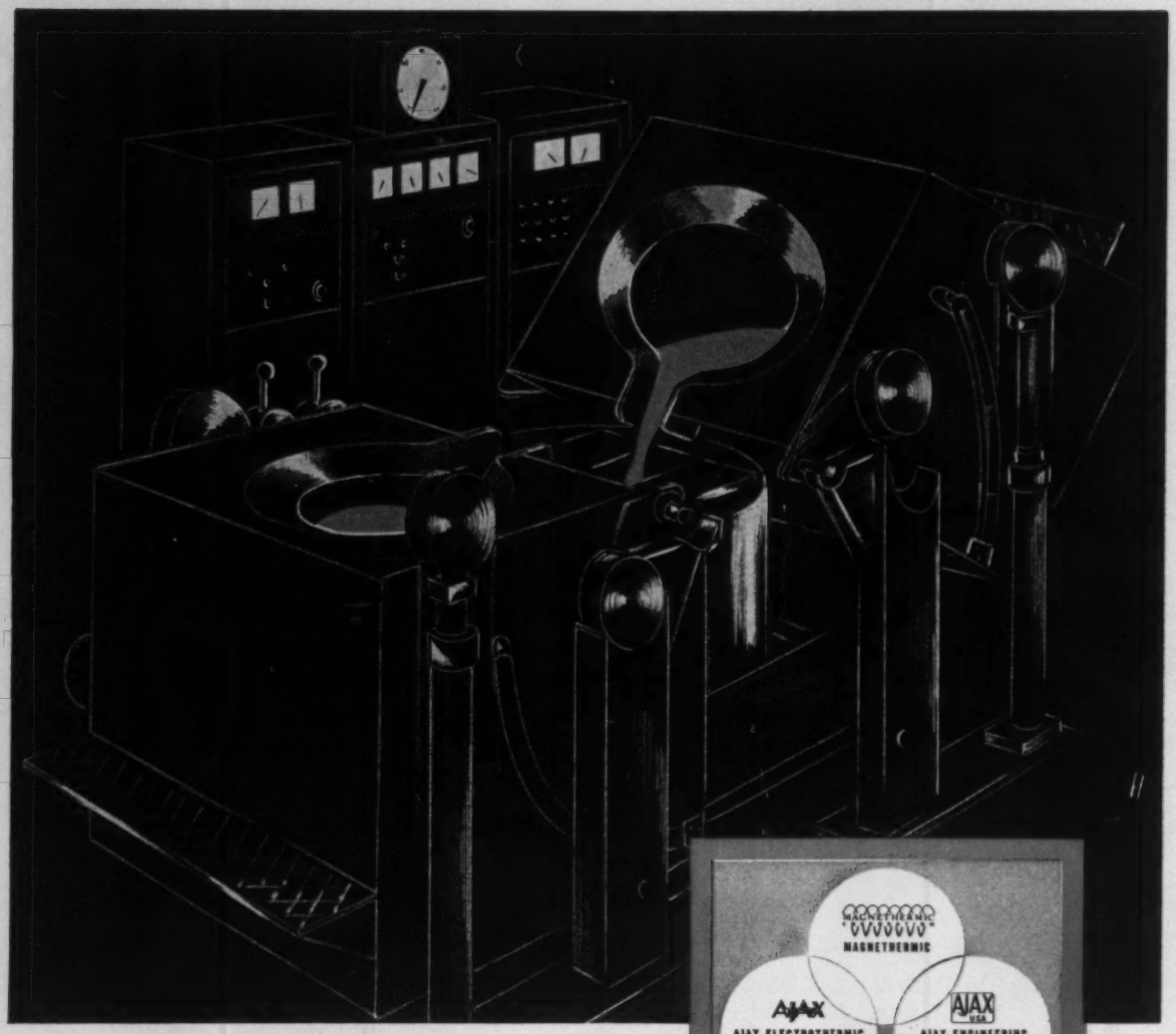
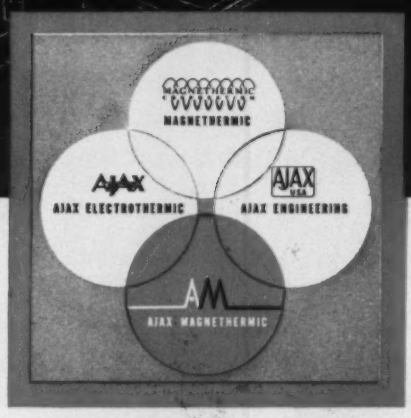
NEW! WARNER & SWASEY'S O-AC Single Spindle Chucking Automatics designed to automate the production of small precision parts...hold exceptionally close tolerances...set up fast on small lots



These twin 1000-lb. melting furnaces prepare copper for metal powder at the St. John's, Michigan, plant of Federal-Mogul-Bower Bearings, Inc.



WATCH AM

FOR THE NEW IDEAS IN HEATING AND MELTING BY INDUCTION

Copper Melting Furnaces, one of many products of AM, for the heating or melting of metals by Induction.

"induction heating is our only business"

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Trenton 5, New Jersey

YOUNGSTOWN DIVISION
3990 Simon Road
Youngstown 1, Ohio

An Expert Beats-the-Experts

Wearing the big grin (at the left) is the champion guesser in our Beat-the-Experts contest for the first half of 1960. He's Bill Schlangen of San Mateo, Calif., a market and sales analyst for a large steelmaking company. His estimate—that 3,809,715 U. S. passenger cars would be built in the first half of 1960—was only 210 units more than the preliminary figure set by *Ward's Automotive Reports*, our contest authority on production.

Ed Case, our metallurgical editor, shown depositing car keys in Mr. Schlangen's hand, stopped in for a visit while traveling through the West. After looking over the 21 cars made by Ford Div., Ford Motor Co., Mr. Schlangen decided a T-Bird fit him to a T. In October, he and his wife will fly to New York, pick up a Thunderbird, and tour New England for two full weeks.

Mr. Schlangen was a classmate (Amherst '51) of Pittsburgh Resident Editor Bill Wallace. Winner Bill was all for furthering alumni relations, saying it would be dandy for Editor Bill to deliver the keys in person. We dislike disrupting alumni get-togethers, but Editor Bill had his fling last year when he delivered a model car to the calendar 1959 winner.

Out of 1600 Entrants . . .

. . . Five others won awards in the contest. Right handsome color prints of a dream car, rendered specially by Virgil M. Exner, Chrysler Corp. vice president and director of styling, went to:

Taisto Lindholm, purchasing agent, Tannewitz Works Inc., Grand Rapids, Mich., (2594 units under); J. T. Anderson, manager, Commercial Research Div., Armco Steel Corp., Middletown, Ohio, (2840 over); S. W. Martin, project engineer, Pitney-Bowes Inc., Stamford, Conn., (3522 over); C. G. Roveran, vice president, H-B Instrument Co., Philadelphia, (4405 under); and Jack F. Wood Jr., sales correspondent, Northwestern Steel & Wire Co., Rock Falls, Ill., (4736 under).

Footnotes

In reviewing the entries to make sure there wasn't a slip, we discovered that nearly all job titles in metalworking were represented—including chairmen . . . There were a few housewives too, which indicates pappy might do some STEEL reading in his favorite easy chair at home . . . Though the preponderance of coupons came from the East and Midwest, our winner was (as you have already noted) from the West Coast . . . Mr. Schlangen, incidentally, was closer (by 86 units) than any previous Beat-the-Experts winner.

Hang on 'til January

Some 1100 readers took a crack at guesstimating U. S. passenger car production for 1960 in the contest that closed June 30—results will be announced sometime in January, 1961. Prizes are the same as those in the contest for the first half, 1960.

Work Simplification

"I have read with much interest the Production Efficiency series and would appreciate two sets," writes Owen W. Miller, assistant professor of industrial engineering, Washington University.

"We are quite impressed with several of the articles and believe this material will be a good addition to the work simplification program we are conducting at General Steel Castings Corp., Granite City, Ill."

100 Million Watt Mule Kick

Clamp a thin piece of metal in a die, apply an electromagnetic field—then wallop the pieces with a 100 megawatt discharge from a bank of condensers. Result: Forming, within one thousandth

"the HITCHINER way..."

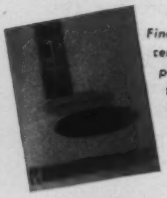
cut costs two-thirds by INVESTMENT CASTING

These roller mounts, used on a precision skin-grafting machine, guide rollers which regulate the depth of the skin graft. The material used must withstand the high temperature of sterilizing and the corrosive elements of human blood.

The user of these stainless steel roller mounts once thought they could only be made by machining of stainless steel bar stock. Hitchiner's "Engineered Quotation" showed they could be investment cast, not only in the necessary alloy and without design changes, but with considerable savings.

The use of investment casting meant five times greater production without highly-skilled labor, a one-per-thousand reject rate, and a per unit cost of a third that of machined parts.

This wide freedom of choice in alloy, as well as flexibility in design may help you with your parts manufacturing problems. Try "the Hitchiner way" yourself and send us a sample or blueprint for our "engineered quotation" — no obligation.



Find out how our new ceramic shell technique can possibly benefit you. Send for our free, new revised brochure on the latest investment casting methods.

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MANUFACTURING COMPANY INC.
MILFORD 27, NEW HAMPSHIRE

Coast to Coast Engineering Representatives

of a second, by one of metalworking's newest tools—electromagnetism.

Researchers are intrigued with the new application. It promises lower forming costs, heat treats the metal during forming, can crimp insulated tubing, cut and machine metals. It's all hush-hush. Aircraft companies are investigating proprietary aspects and won't let our editors take pictures. But Associate Editor Ross Whitehead got an inside track on the process and you can read about it next week in STEEL.

The Flaw Detector

"Your June 27 article, 'How to Tell Good Hot Dip Galvanizing,' is excellent," writes John Rotsko, assistant to works manager, Hope's Windows Inc., Jamestown, N. Y. "It does an outstanding job of covering and summarizing the requirements of a good coating.

"We would like each key plant supervisor to have a copy for general reference and also as a guide when confronted with flaws. If copies are still available, we would like ten."

(Editor's Note: Four days after the article appeared, we ran out of copies. Requests indicate that the article and illustrations will be used on the job as a guide to quality. We laid in another stock of tearsheets. If you'd like to have one, just drop a line to STEEL, Editorial Service Dept., 1213 W. Third St., Cleveland 13, Ohio.)

You Can Win $1000 This Month

There are five issues of STEEL this month—and one could help you win $1000 in our Usership Idea of the Month Contest.

Tell us, in 300 words or less, how you plan to USE an article or advertisement in this issue (or any other issue published this month—August, 1960) to help you accomplish an important personal or company objective. Be as specific as you can. If, in the opinion of the judges, yours is the best idea submitted—**you will win $500.**

There's more . . . You will win an additional $500 if you furnish written proof that you accomplished your objective. Proof must be submitted within six months after you are declared winner of STEEL's Usership Idea of the Month Award.

You may enter as many times as you wish. Please identify your letters as Usership entries. They will be judged by a committee of STEEL's editors. All letters become STEEL's property.

Send your entries to me, Ed Service, Servicenter, STEEL, 1213 W. Third St., Cleveland 13, Ohio. **Deadline for this month's contest is Oct. 1.**

Fluid Power NEWS

REPORT NO. 11,802 AUTOMATIC METALS BRIQUETTING PRESSES

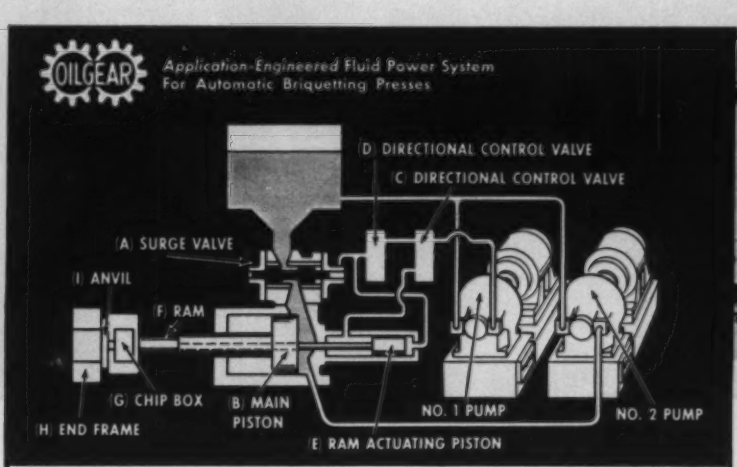
From Oilgear *Application-Engineering* Files

HOW OILGEAR-EQUIPPED BRIQUETTING PRESSES PRODUCE MORE—LONGER—AUTOMATICALLY

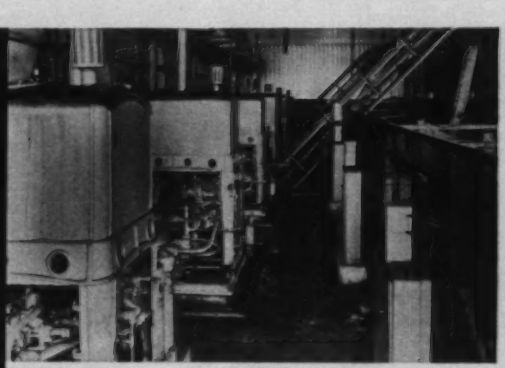
CUSTOMER: *Milwaukee Foundry Equipment Division of SPO Inc.*

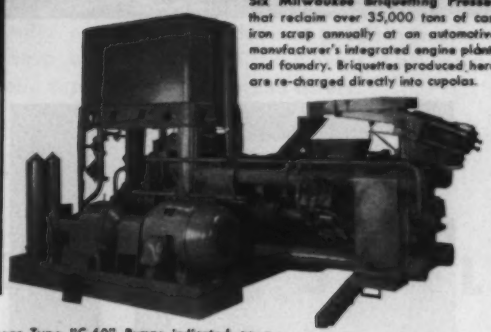
DATA: To power a line of presses specially designed for low cost, rapid conversion of bulky, low-grade metal turnings and borings into dense, uniform-sized briquettes to: conserve storage space; simplify handling; prevent storage oxidation—particularly with finely divided metals or sponge iron; provide sufficient density and size to melt rather than flash into oxide on entry into foundry cupola; control metal content; provide a simple means of accurate compounding for alloying or supplying a flux.

PRESS SYSTEM REQUIREMENTS: 1. Eliminate wear and maintenance costs resulting from use of gears and bearings. 2. To be controlled hydraulically, electrically, or electrohydraulically for automatic cycling at rates ranging from 9 to 17 strokes per minute. 3. Sufficient force to provide briquette densities of 70 to 80% with conservative pump loading. 4. Long life, rugged dependability . . . capable of years of continuous operation with an absolute minimum of maintenance.



HOW IT WORKS: Oilgear Pump No. 1 is the main operating pump. Oilgear Pump No. 2 supplements fluid for a high-speed compression stroke. Cycle starts with fluid from No. 1 Pump through Oilgear Directional Control Valves (C, D) to Ram Actuating Piston (E), moving Ram (F) forward in Chip Box (G) at high speed and transferring loose material into the die. Surge Valve (A) is open to provide gravity flow of fluid from Reservoir (H) to Main Cylinder (B). When a preset pressure is reached, Surge Valve (A) closes, and fluid from Pump No. 1 is delivered to both Ram Actuating Piston (E) and Main Piston (B) with output of Pump No. 2 added for final compression stroke. When maximum preset briquetting pressure is reached, Valve (D) automatically directs fluid to a stripping piston, removing die held in Chip Box (G) from formed briquette. Chip Box movement trips a switch causing Valve (C) to direct fluid to open Surge Valve (A) and retract Ram Actuating Piston (E) and Ram (F) at high speed. Finished briquette drops out and a new cycle is automatically started. Processing cast iron borings on the two-pump press is completed in 5 or 6 seconds—10 to 12 cycles per minute, to produce up to 700 ten-pound briquettes—better than 3 tons of ideal cupola scrap every hour. These two-pump-system presses have over 40% more output than an identical press with a single pump.





Six Milwaukee Briquetting Presses that reclaim over 35,000 tons of cast iron scrap annually at an automotive manufacturer's integrated engine plants and foundry. Briquettes produced here are re-charged directly into cupolas.

One of the two Oilgear Type "C-60" Pumps indicated on a 350-ton Milwaukee Briquetting Press. Note how briquettes roll out of the press to be picked up by magnets.

SOLUTION: Oilgear *Application-Engineered* systems consisting of Oilgear Type "C" Heavy-Duty Constant Displacement Radial Rolling Piston Pumps and Directional Control Valves. Pump requirements range from 23 gpm on the 75-ton Presses to 325 gpm on new 1000-ton presses. *Milwaukee Foundry Equipment*—builder of over 80% of all briquetting presses, and an exclusive user of Oilgear Fluid Power Systems since 1927—recently reported: "*We just modernized a press that had been in continuous cast iron briquetting operation for over 18 years . . . there had been no reported major maintenance . . . the Oilgear components still operated fine—with no appreciable signs of wear or loss in efficiency.*"

This is just one evidence—out of hundreds—of the long service life of Oilgear Systems. Ten or more years of continuous service is common with Oilgear equipment, rather than the exception . . . with many of these systems operating under adverse conditions—rapid cycling, grit-laden air, heat, and extreme humidity. Where the going is toughest—Oilgear Pumps just keep rolling along . . . quietly, efficiently.

With Oilgear Heavy-Duty System Components designed for thousands of hours of continuous service at full rated load, savings are compounded with every hour of uninterrupted performance. That's why machinery and equipment manufacturers and *their* customers say . . .

"for the lowest cost per year . . . it's Oilgear!"

For solutions to YOUR linear or rotary Controlled Motion problems, call the factory-trained Oilgear Application-Engineer in your vicinity. Or write, stating your specific requirements, directly to . . .

THE OILGEAR COMPANY

Application-Engineered Controlled Motion Systems

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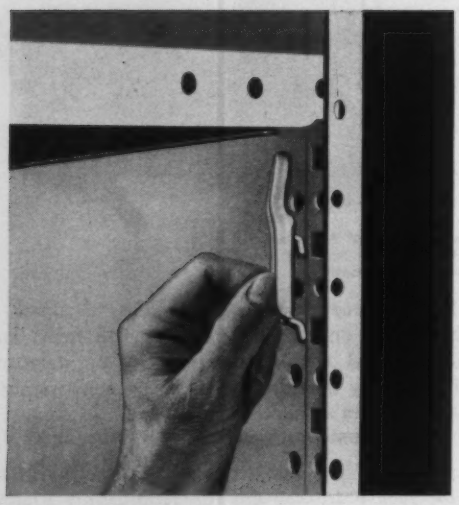
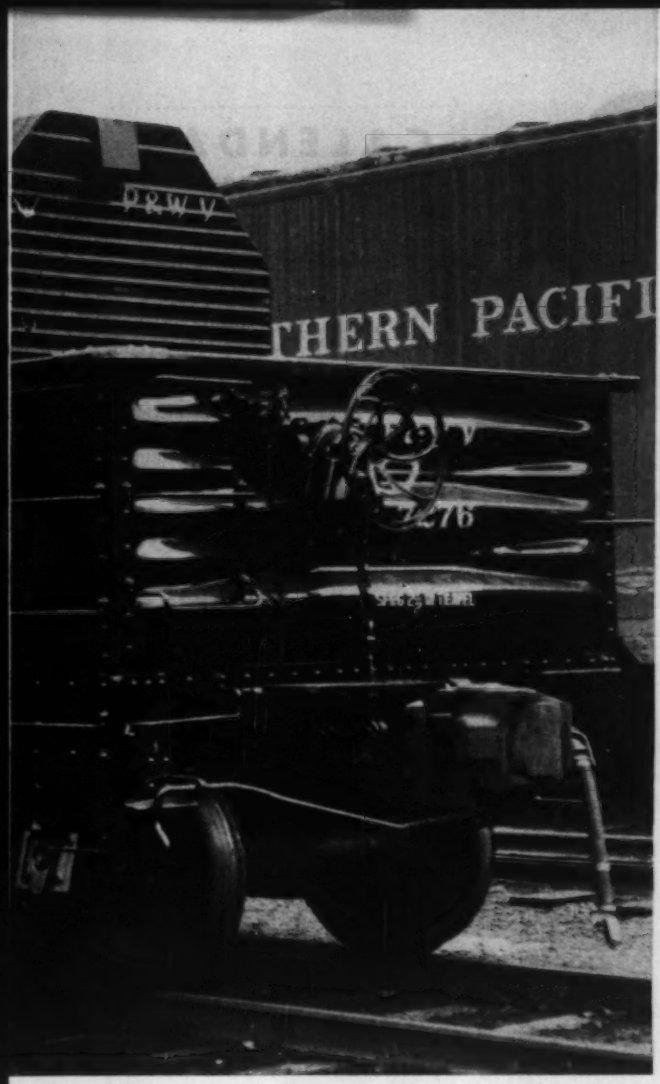
Phone: Mitchell 5-6715 . . . Direct Distance Dialing Code 414



NEW FROM REPUBLIC—COMPRESSION SHELF CLIP solves stock and store problems quickly, easily, economically. Designed to ease and speed steel shelving erection. No tools needed. Simply slip clips onto uprights, snap shelf in place. Adjustable, reusable. Supports heavy loads safely. Write for complete information.

REPUBLIC METAL LUMBER provides faster, stronger, safer framing in any application where common building materials are now being used. Simply measure, cut, assemble. Fabricated from cold rolled steel to assure uniform physical properties and high strength-to-gage ratio. Bonderized for complete protection of all exposed surfaces. Engineered slotted angle pattern speeds erection, reduces time and material costs. Available in two gages, two widths, in standard bundles of 10- or 12-foot lengths. Send for attractive brochure.



protect cargoes with

REPUBLIC COIL COVERS

Republic Coil Covers speed and simplify freight handling, protect cargoes in transit, stop vandalism.

Designed for use on standard gondola and flat cars. Approximately 22 feet long, 6 feet wide, and 6 feet high. Two covers are furnished for each car.

Constructed of 13-gage sheets with 3/16" reinforcing members. Corrugated steel construction provides added strength, assures long service life at lowest per-year cost. Weight: Approximately 2,400 lbs. per cover.

Republic Coil Covers are easily handled by overhead or track-side cranes. Six specially designed stacking brackets permit easy tiering during loading-unloading operations.

To offer your customers the best possible protection, ship with Republic Coil Covers. Call your Republic representative, or write direct.

STANDARD REPUBLIC MATERIAL HANDLING UNITS save time in stack, store, ship operations. Reduce storage space requirements. Corrugated construction designed to deliver long, trouble-free service. Four-way fork channels simplify handling in restricted areas. Engineered stacking brackets permit safer tiering in handling and storing. Republic material handling specialists will recommend proper Republic Units to save production time and costs. Write today.

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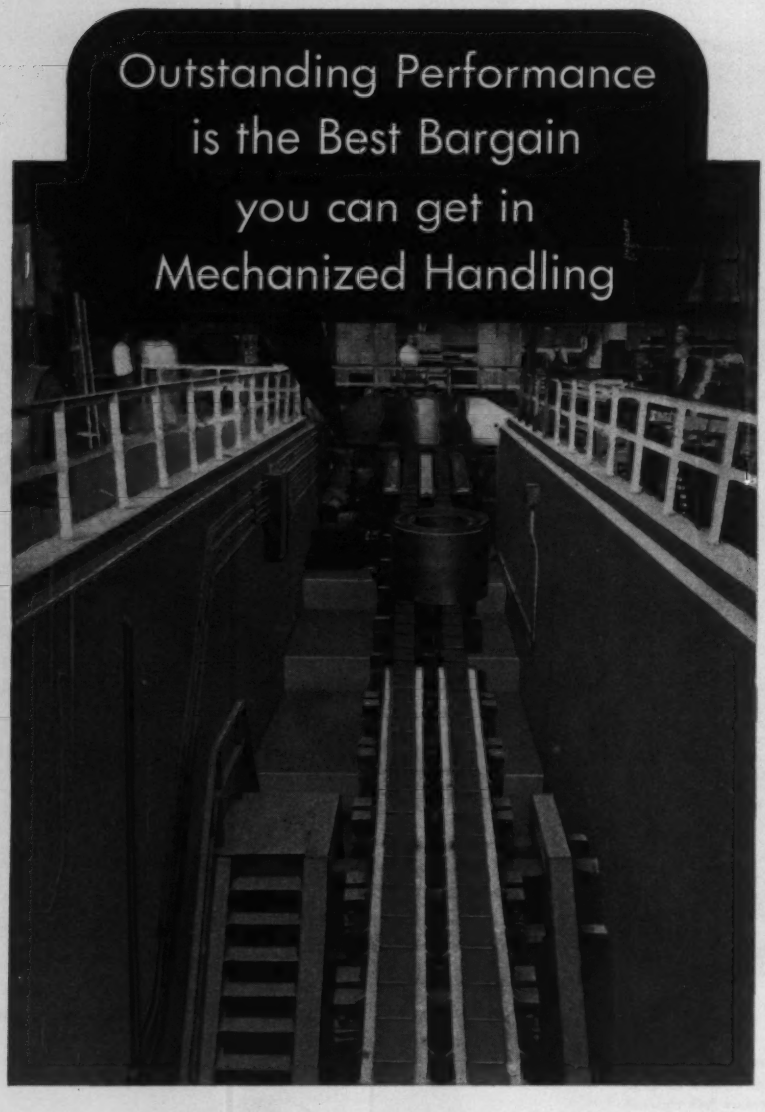

• Many plant operating people responsible for specifying conveying systems today are demanding equipment that is right *for them*—that will fully meet *their* individual requirements—that is built to operate under severe service. They are looking beyond the price—to design and quality.

Mathews Engineers are giving these people a complete conveyer service — from the first proposal through installation—and equipment that is delivering outstanding performance in the metalworking industries.

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WESTERN DIVISION ..... MATHEWS CONVEYER COMPANY WEST COAST
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CANADIAN DIVISION ..... MATHEWS CONVEYER COMPANY, LTD.
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Over Fifty Years of Leadership in Mechanized Handling

MATHEWS

CALENDAR
OF MEETINGS

Aug. 8-12, American Institute of Electrical Engineers: Pacific general meeting, U. S. Grant Hotel, San Diego, Calif. Institute's address: 33 W. 39th St., New York 18, N. Y. Secretary: N. S. Hibshman.

Aug. 15-17, American Society of Mechanical Engineers and American Institute of Chemical Engineers: Heat transfer conference and exhibit, Statler-Hilton Hotel, Buffalo. Information: ASME, 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Aug. 16-19, Society of Automotive Engineers Inc.: National West Coast meeting, Jack Tar Hotel, San Francisco. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 3-4, American Machine Tool Distributors Association: Annual meeting, LaSalle Hotel, Chicago. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Sept. 6-16, National Machine Tool Builders' Association: The Machine Tool Exposition — 1960, International Amphitheatre, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 6-16, Production Engineering Show: Navy Pier, Chicago. Information: Clapp & Poliak Inc., 341 Madison Ave., New York 17, N. Y.

Sept. 7-9, American Society of Mechanical Engineers: Instruments and regulators conference, Massachusetts Institute of Technology, Cambridge, Mass. Society's address: 29 W. 39th St., New York 18, N. Y. Secretary: O. B. Schier.

Sept. 7-15, Coliseum Machinery Show: Coliseum, Chicago. Information: A. Byron Perkins & Associates, 2807 Sunset Blvd., Los Angeles 26, Calif.

Sept. 12-13, Industrial Truck Association: Fall meeting, Cavalier Club, Virginia Beach, Va. Information: Hanson & Shea Inc., 1 Gateway Center, Pittsburgh 22, Pa.

Sept. 12-15, Society of Automotive Engineers Inc.: National farm, construction, and industrial machinery meeting; production forum; and engineering display, Milwaukee Auditorium, Milwaukee. Society's address: 485 Lexington Ave., New York 17, N. Y. Secretary: John A. C. Warner.

Sept. 13-15, American Chemical Society: Fall meeting and exhibit, Statler-Hilton Hotel, New York. Society's address: 1155 16th St. N.W., Washington 6, D. C. Executive secretary: Alden H. Emery.

Mack-Hemp rolls are right for every mill

. . . IN MERCHANT MILLS

For typical conditions: Mack-Hemp *Technigrain* and *Technigrain Special* alloy iron rolls give you exactly the degree of wear resistance you need for normal production run conditions in roughers, strands and leaders. Tailored to your specific requirements, these rolls have deep hardness penetration to assure minimum wear in the passes through many redressings.

For finishing: You'll find that Mack-Hemp *Nironite C Special* nickel alloy grain iron rolls have the hardness and fine grain structure to roll a top-quality finish on your merchant products in normal production runs.

For severe, heavy-draft conditions: If you have a tandem set-up that's been giving you a roll breakage problem, you can cure its tendency with Mack-Hemp *Technikrome*, *Stironite* or *Supermetal* high-carbon alloy steel rolls. All of these roll types can be used for roughers, intermediates and finishers. They are alloyed for increased strength and wear resistance, with *Supermetal* and *Stironite* rolls showing somewhat higher hardness.

Every Mack-Hemp roll that leaves our plants has been as carefully mated to your specific mill conditions as we know how to make it. It's your guarantee of *getting more tonnage from the rolls with the striped red wabblers.*

MACKINTOSH-HEMPHILL DIVISION · PITTSBURGH · U.S.A.

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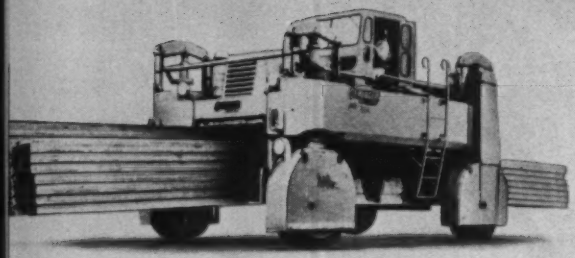
TOWMOTOR-GERLINGER

offers you three complete capital-saving services!



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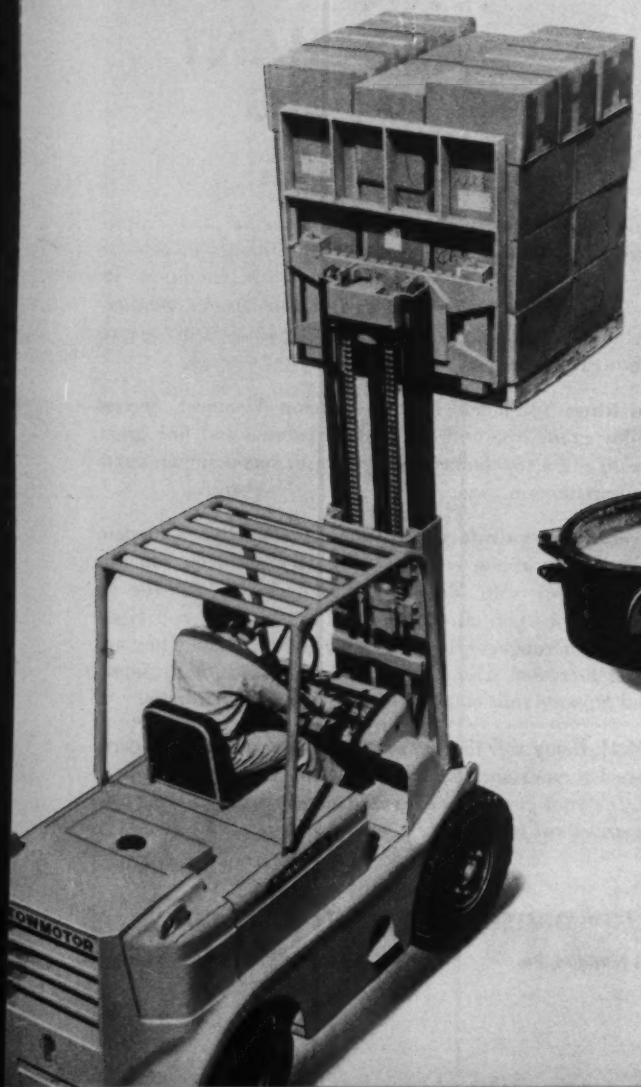
You don't make a *down payment* when you use the Towmotor-Gerlinger Lease-A-Truck Plan. You put T-G equipment to work on a continuous, year-'round basis. You just make a small monthly payment—paid out of savings the equipment produces.

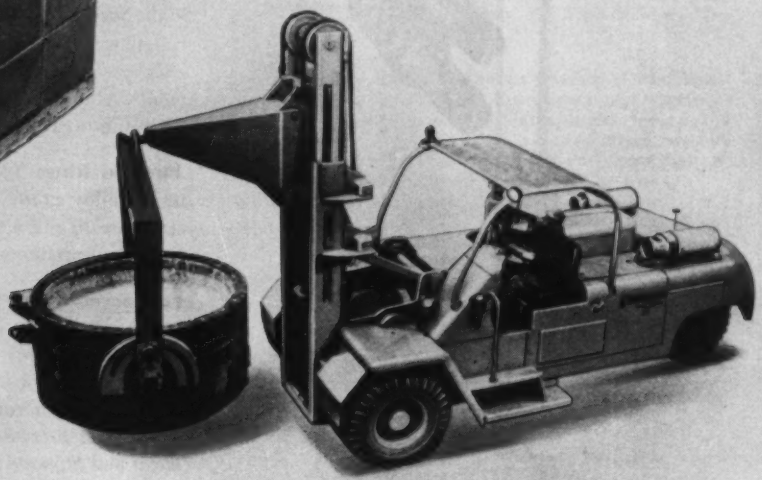
2 YOU RENT *without cash outlay!*

You don't tie up working capital when you *rent* Towmotor-Gerlinger fork lift trucks and material carriers. You put them to work immediately. You start cutting handling costs immediately. Your only cash outlay is one small monthly charge.

3 YOU BUY *and save as you pay!*

You don't pay cash for Towmotor-Gerlinger equipment when you use our low-cost Time Payment Plan. You make reasonable monthly payments. Low interest rates make it easy. Handling economies consistently pay the monthly cost many times over.





Complete factory-supervised maintenance can be included in *any* of the above plans! For complete information, write Towmotor-Gerlinger Rental Division, Towmotor Corporation, Cleveland 10, Ohio.

TOWMOTOR® -GERLINGER

THE ONE-MAN-GANG

FORK LIFT TRUCKS, CARRIERS AND TRACTORS SINCE 1919

Gerlinger Carrier Co. is a subsidiary of Towmotor Corporation

6,000

ways
to get extra
efficiency

There are 6,000 different types of Nicholson and Black Diamond files. There's one that's precisely right for your operation... and the materials you file. • Using the correct file contributes to efficiency by reducing the amount of filing time. Time, not the file, represents the largest part of filing costs. • Nicholson and Black Diamond files pay off another way, too. Their high quality substantially reduces tool replacement costs. • We take infinite care to produce the highest quality files available. You'll find that your Industrial Distributor carries a complete selection under the Nicholson or Black Diamond brand. • The next time you need a file specify Nicholson or Black Diamond for standard or special purpose files... X. F. (Extra Fine) brand in Swiss Pattern. Ask your distributor's advice... he'll keep you informed on the various types best suited for your job. Ask him, too, about the newly improved line of Nicholson soft faced industrial hammers.

* **Industrial Distributors provide the finest goods and services in the least possible time. Our products are sold exclusively through them.**

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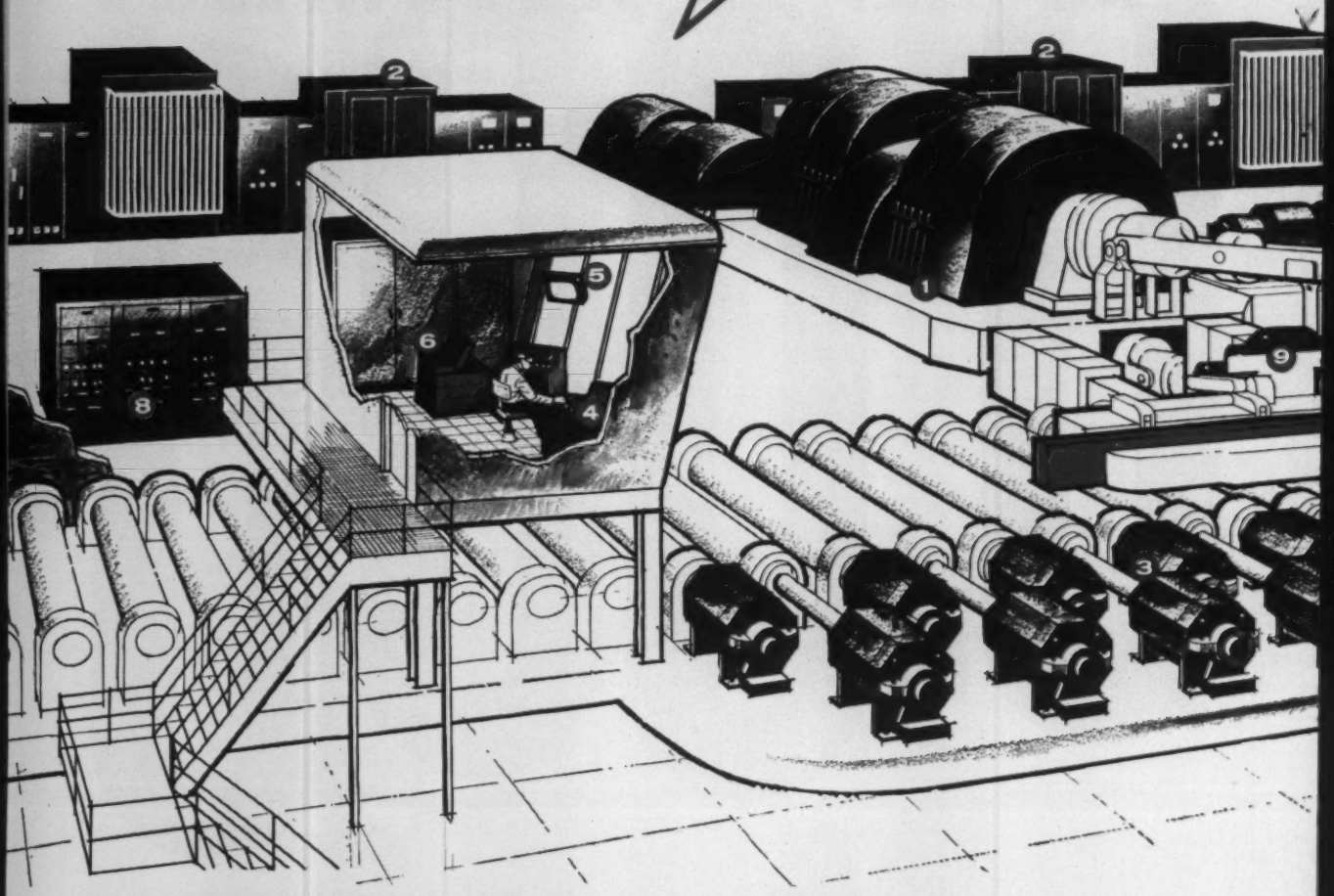
FILES • ROTARY BURS • HACKSAW AND BAND SAW BLADES • GROUND FLAT STOCK • INDUSTRIAL HAMMERS

FOR QUALITY . . .
PRODUCTIVITY
. . . PROFIT

REVERSING HOT MILLS
automated by General Electric



General Electric's step-by-step approach to automation is . . .

The Best Way to Meet the Competitive

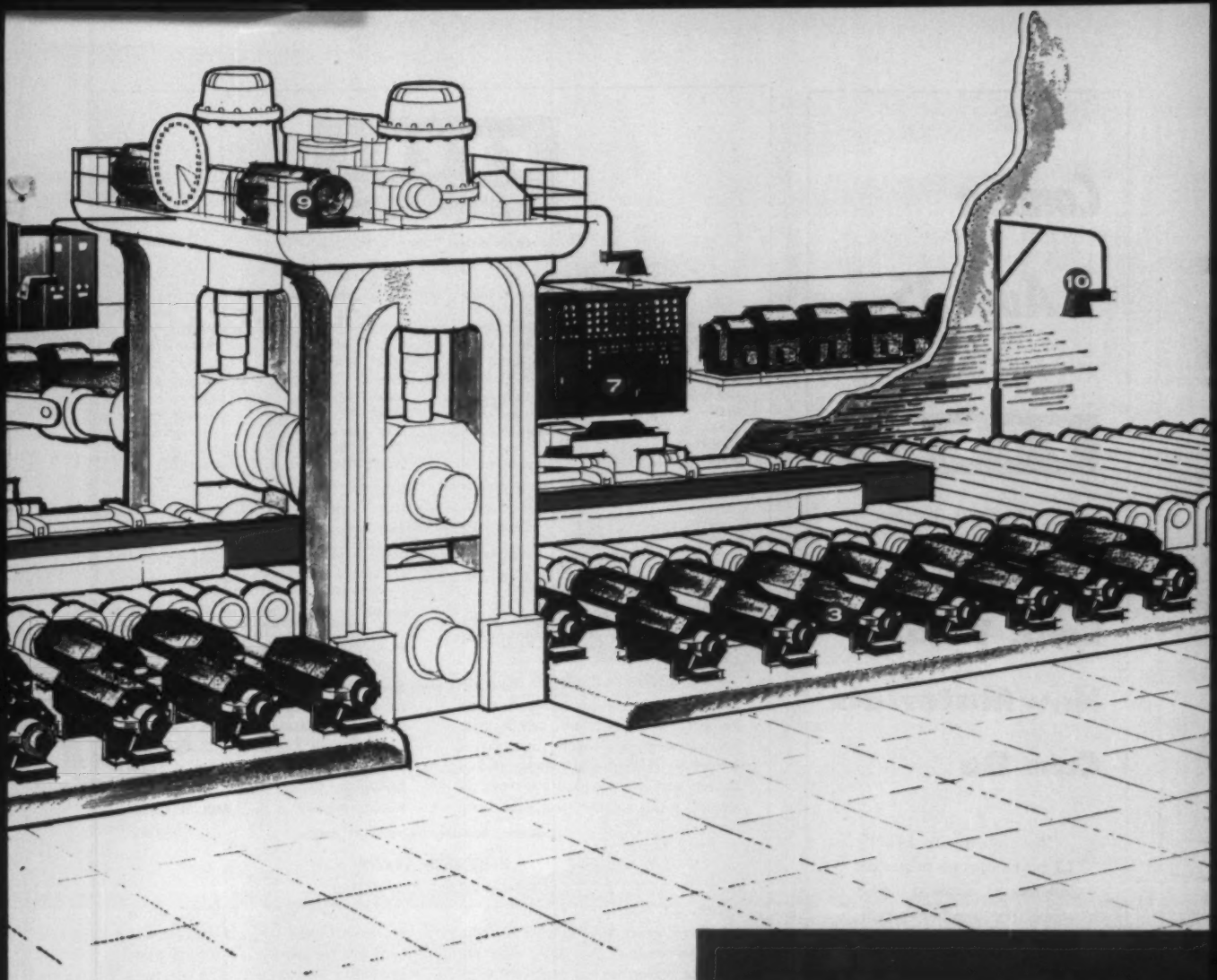
Competition in the primary metals market is on the increase today as never before. As management looks for ways to meet this challenge, their attention is turning to automation to improve production efficiency, operating costs, and product quality. But economic considerations of primary metals producers eliminate any thoughts of "overnight" automation with its hasty planning, uncertain costs, and unpredictable results.

GENERAL ELECTRIC'S PLAN is based on a series of modernization steps which combine economic soundness with predicted benefits of automation.

For example, many Reversing Hot Mills are producing automation benefits today as a result of modernization programs begun four years ago. Application of pre-programmed drafting practices is resulting in fewer passes, higher and more consistent product quality, lower scrap. Drastically reduced maintenance and equipment abuse is resulting in lowered operating costs. Automation flexibility is allowing product variations consistent with changing market requirements.

Consider the automation of *your* Reversing Hot Mill: As a first step, General Electric will help you survey your mill to determine which electrical-system components will best meet the precise demands of automation. From this survey comes a series of installation steps sequenced to keep downtime at a minimum and at the same time, make your basic system suitable for the next step—automation. As these products are installed real savings start, because General Electric system components are designed to reduce installation and maintenance costs while providing the precise response and maximum reliability demanded by automation.

THE NEXT STEP in General Electric's plan is the application of a programming system and new sensing devices, system-engineered to provide completely automatic operation of the mill and associated auxiliaries. Then it becomes possible, through the addition of an information-handling system, to observe all mill operations, compare these operations with current job specifications and, if necessary, make instant adjustments in rolling instructions which are signaled to the mill drive system after each pass.



Challenge of the 60's

Even greater savings begin in this step as maximum utilization of the mill becomes consistent with the limits of the mill, the drive system, and even the metallurgical limits of the ingot or slab. After automation of your mill has been completed, new product and system technology makes it possible to link associated production processes, such as the soaking pit, ingot buggy, and reheat furnaces, into an automated production area. Then this area can be integrated with other areas to provide completely automatic production scheduling and manufacturing throughout the entire plant. Over-all performance will be in direct accord with management decisions based on all of the many complex variables that determine profitable plant operation.

Let General Electric begin working with you now in meeting your competitive challenge. You'll find the capability to provide any degree of automation a reality at General Electric today. For complete details, call your nearest Apparatus Sales Office. General Electric Company, Section 659-01, Schenectady 5, New York.

SYSTEM-ENGINEERED ELECTRICAL EQUIPMENT FOR THE COMPLETELY AUTOMATED REVERSING HOT MILL

1. "TOP-FORWARD" Main Drive Motors
2. Ignitron Mercury-arc Rectifiers, using new Silicon Controlled Rectifier firing circuits, or Motor-generator sets, for main d-c power supply
3. MD-600 Auxiliary Mill Motors
4. Mill Operators' Control Console, including X-Ray Sensor Read-out
5. Closed-circuit Television
6. Process Control System incorporating GE312 General Purpose, Digital Control Computer
7. DIRECTO-MATIC Main Mill Control
8. DIRECTO-MATIC Static Program Control equipment
9. MD-600 Screw-down Motors
10. Sensing equipment for process evaluation

AUTOMATION THROUGH MODERNIZATION

GENERAL ELECTRIC

Coming

Aug. 15

IN

STEEL

Look What New Materials Can Do

The fourth in STEEL's 13-part series on Materials Efficiency appears next week. It's another installment in the 1960 Program for Management, designed to show how to attain higher efficiency to counteract growing foreign competition and rising wages and other costs.

In its Aug. 15 issue, STEEL will answer these questions:

- Why can new materials help you?
- Where can they help you?
- What should you look for in new materials?
- How can they pay off?

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MAin 1-8260

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A STEEL bar is a white hot stream of molten metal shooting from a furnace. A steel billet squeezed by giant rollers to precise shapes. Youngstown hot rolls and cold draws rounds, squares, flats and hexes . . . angles, channels, tees and zees, Youngstown special quality bar to specifications. And, when strength with ease of machinability are desired, choose Yolead leaded steel. Over 800 different kinds of carbon, alloy and Yoloy steel bar products come from Youngstown, a growing force in steel.

A YOUNGSTOWN STEEL bar is the axle shaft on your car. A nut. A bolt. A staple. It is a polished hydraulic lifting arm, a pin in a tractor tread. It is a mat of reinforcing bars. A length of wire rope. From mine to open hearth to bar mill cut lengths and coils, Youngstown steel bar is tested, retested and delivered to you on time. You can get it from your steel warehouse or through 28 Youngstown Offices. Whatever your needs for quality bar, rod and wire, depend on Youngstown, a growing force in steel.

Youngstown – growing force in steel

THE YOUNGSTOWN SHEET AND TUBE COMPANY, YOUNGSTOWN, OHIO. ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND COLUMBUS DALLAS DENVER DES MOINES DETROIT GRAND RAPIDS HOUSTON INDIANAPOLIS KANSAS CITY LOS ANGELES MILWAUKEE MINNEAPOLIS NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS SAN FRANCISCO SEATTLE TULSA WASHINGTON

STANSCREW

Symbol of a new concept

in fastener service

American industry is learning Stanscrew means extra values.

This symbol personifies a trained staff of fastener specialists. Their technical assistance can often help you reduce fastener and assembly costs.

It means extra quick deliveries from complete inventories maintained at three conveniently located plants . . . over 5,000 different types and sizes to assure a broad selection for the great majority of your requirements . . . and, above all else, fasteners of consistently high quality.

Although it first appeared in 1958, the Stanscrew trademark represents a wealth of fastener experience. For it combines the technical skills and specialized facilities of three major manufacturing divisions of Standard Screw Company, each an honored name for more than 80 years. They are:

THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

For fasteners, specify Stanscrew. For other needs of home and industry, Standard Screw divisions also produce:

Moen single-handle faucets • *Hartford textile spindles*
Roosa Master fuel injection pumps • *Chicago tappets*

Each division also provides a complete design and manufacturing service for cold headed and screw machine products.

STANDARD SCREW COMPANY
2701 Washington Boulevard • Bellwood, Illinois

Every one a winner! ***Vancoram Exothermic Alloys***—— Where quality's concerned, all five Vancoram Exothermic Alloys are outstanding! So choosing between them comes down to picking the right type for your application. Every Vancoram Exothermic Alloy has been completely and intensively tested in laboratory, pilot plant and in the field. You can be sure of utmost addition efficiency with minimum cooling effect on the metal. Next time you specify, remember these names: THERMOKROM® (Ferrochromium) · THERMOSIL® (Ferrosilicon) · THERMOKROMSIL® (Ferrochrome-silicon) · THERMOVAN® (Ferrovanadium) · THERMOCOL® (Ferrocolumbium). Each comes in steel cans—palletized for easy handling. Alloy content is exactly preweighed for accurate, no-trouble addition. For more facts and figures about the economies of these Vancoram Exothermic Alloys, call or write your nearest VCA District Office. Vanadium Corporation of America, 420 Lexington Avenue, New York 17, N. Y. · Chicago · Cleveland · Detroit · Pittsburgh

VANADIUM
CORPORATION OF AMERICA
Producers of alloys, metals and chemicals

VANCORAM

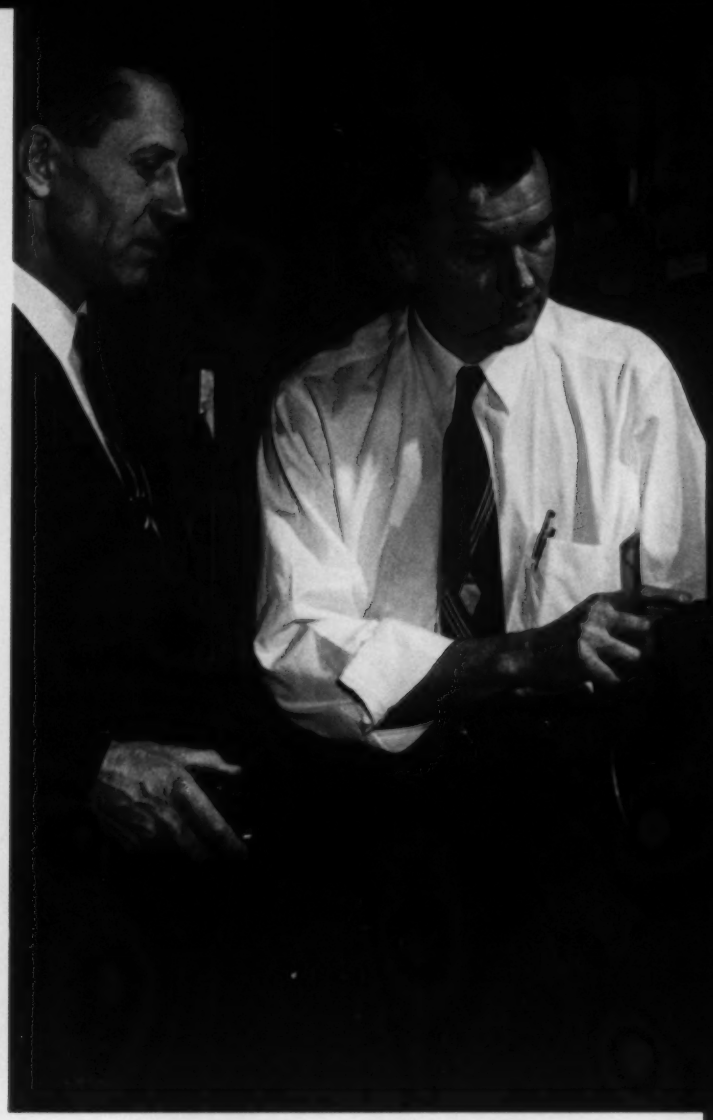
Iron Fireman Manufacturing Company changes to Gulfcut® oil,

GULF MAKES THINGS

A machining job that had been a problem for years was the test given a Gulfcut oil at Iron Fireman Manufacturing Company, Cleveland, Ohio. The job was hobbing 78-tooth, combination 6-8 pitch main drive gears of UMA-3 forging steel. Until the test, hobs had to be reground after every eight gears—once every cutting cycle.

By using Gulfcut 21C oil, Iron Fireman engineers found that they could get the same tolerances and the same production as before, and that they could cut approximately 30 gears or nearly 4 cycles before re-grinding. In addition, they were grinding one-third less off the hobs than before!

"With 275% increase in hob life, we're getting pretty close to optimum on this job," says Stanley J. Kovac,



At right, C. J. Wires, of the Production Engineering Staff, Iron Fireman Manufacturing Company, with T. F. Irving, Gulf Sales Engineer who recommended Gulfcut.

More than 300 kinds of steel, cast iron and brass gears are hobbed by Iron Fireman Manufacturing Company, all with the aid of Gulfcut oils. Pictured here is a 12-tooth, 6 pitch Ledloy steel pump drive gear, O.D. 2.333, tolerances +.0000, −.0015. Oil is Gulfcut 21C.

increases hob life 275% . . .

RUN BETTER!

Chief Production Engineer. "Performance like this has proved Gulfcut oil to us. We're now using it on all gear cutting operations. We cut 300 kinds of gears, of brass and cast iron, as well as steel."

Do you have a tough machining problem? See how Gulf makes things run better! Just call a Gulf engineer at your nearest Gulf office.

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Dept. DM, Gulf Building
Pittsburgh 30, Pa.

GULF

SP-9822

Made by skilled craftsmen from
WASHBURN STEEL
its Uniformly Superior Quality
insures the Dependability of your
springs. *Famous for years.*

Eagle Music Wire
—for Dependable Springs—

Have you tried our
Phosphate Coated Wire?
Superior uniformity of PHYSICALS

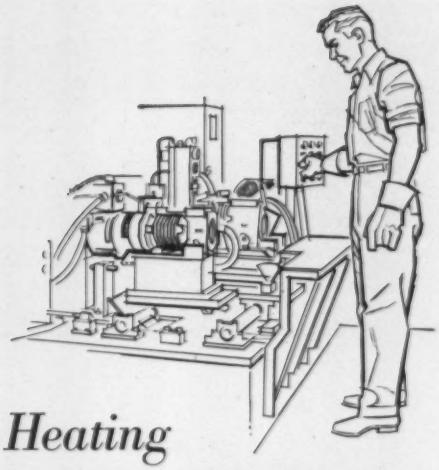
112

WASHBURN

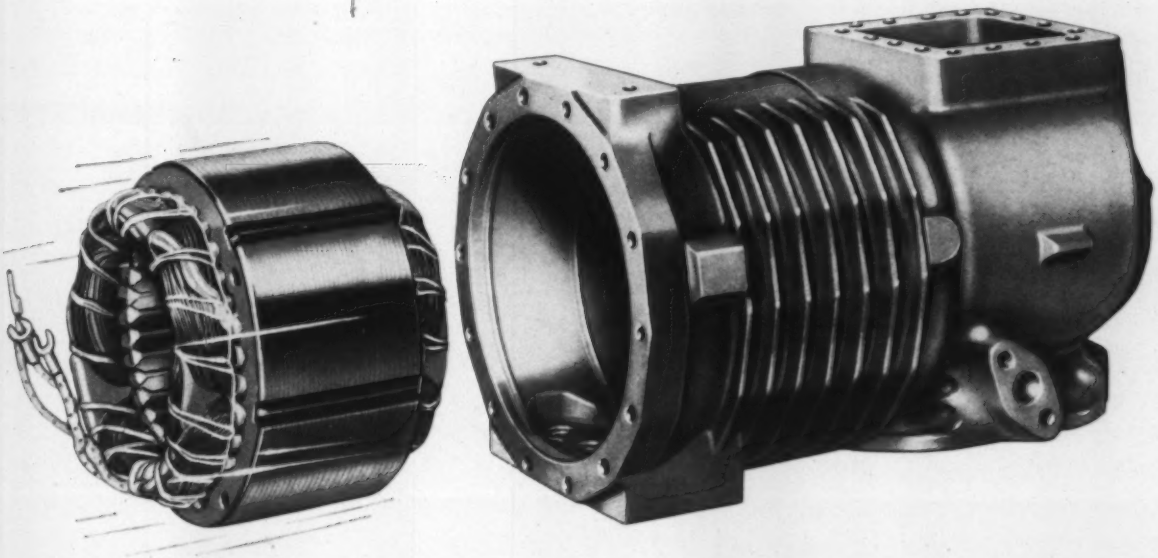
WASHBURN WIRE COMPANY, NEW YORK CITY
CLEAN, UNIFORM BILLETS - STRIP - RECTANGULAR, ROUND, FLAT RODS
TEMPERED AND UNTEMPERED FLAT AND ROUND HIGH CARBON WIRES

How a **Shrink-Fit** E-x-p-a-n-d-s Profits

Copeland Saves $100,000.00 A Year



with TOCCO* *Induction Heating*



Press-Fit Method

In the assembly of motor-compressors for their air conditioning and refrigeration products, Copeland Refrigeration Corporation formerly employed air presses for force-fitting their 1/5 HP through 1½ HP motor housings and stators. This method was costing Copeland $100,000.00 annually in labor, material and quality control expense to maintain the high quality of its product.

TOCCO Shrink-Fit Method

To reduce these costs, Copeland installed a 30 kw, 10,000 cycle TOCCO Induction Heating Unit. Motor housings are heated to 400° F. resulting in up to .013″ expansion. After cooling, the motor housing shrinks to form a predictable and perfect fit with the stator. Stator scoring and distortion are eliminated and $100,000.00 annual saving realized.

Whether your production problem is shrink-fitting or higher temperature applications such as brazing, heat-treating, forging or melting, look to TOCCO for an economical solution to any metal-heating problem.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—**NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept. S-8, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Heating—Principles, Applications, Equipment."

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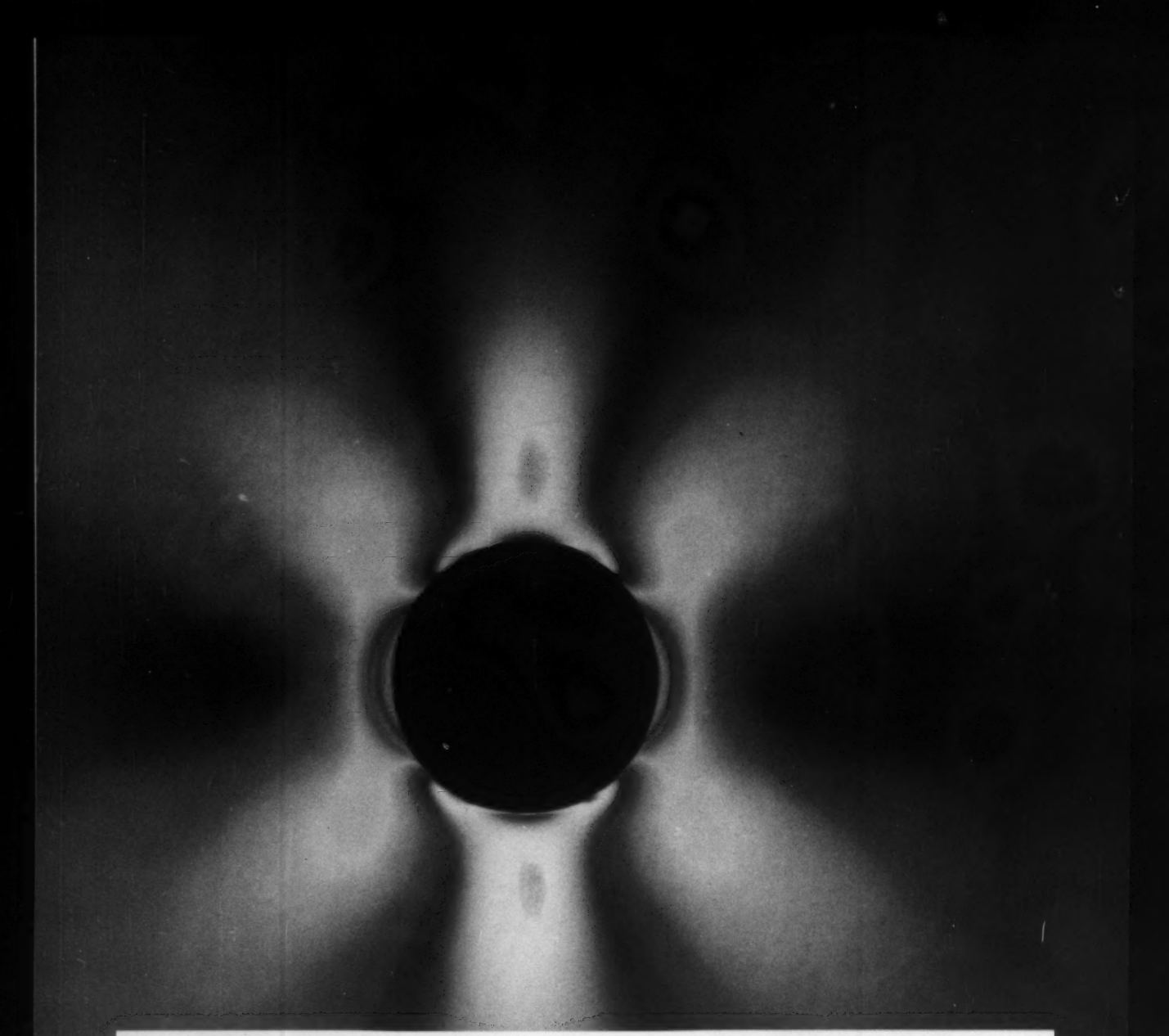


Photo-elastic stress patterns produced by models photographed with polarized light are one of the modern analytic tools available for ever-increasing perfection of Malleable iron castings.

For Greatest Strength Per Dollar... Use Malleable

To improve quality and cut costs, you'll find nothing better than Malleable iron castings. They provide more strength per dollar than any other metal, ferrous or non-ferrous! With Malleable you also get proven toughness, uniform quality and unsurpassed machinability.

See for yourself how much Malleable castings will improve your products and cut your costs. Send drawings or an outline of your requirements to a nearby Malleable castings producer who displays this symbol—

MEMBER
MALLEABLE
CASTINGS COUNCIL

For detailed information on "Strength Characteristics of Malleable Iron Castings", contact any of the progressive companies listed on the opposite page, or Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

"Value Analysis" Proves–

Malleable Castings Improve Quality, Reduce Costs

When "Value Analysis" is your task, consider these outstanding advantages of Malleable iron castings: more strength per dollar than any other metal, ferrous or non-ferrous; exceptional machinability; metal exactly and only where it is needed; job-proven toughness.

Switch to Malleable Saves 47% on Railroad Car Thrust Collar

One of countless examples of cost reduction obtained by changing from other materials or processes to Malleable castings is this thrust collar used on railroad maintenance cars. While the steel part formerly used performed satisfactorily, it cost 99¢ before machining.

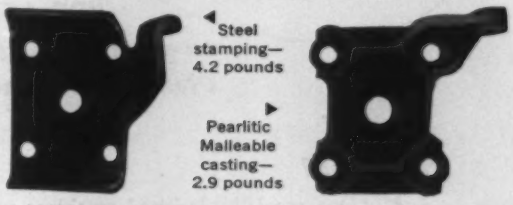
The cost of the standard Malleable casting before machining is only 51.7¢ — a saving of 47.3¢! Added to this, four machining operations — drilling of bolt hole, spot facing for bolt head and nut, milling the sleeve slot and sawing the transverse slot — were eliminated by switching to a casting. All remaining machining operations are improved due to Malleable's exceptional machinability.

Former part before machining (99¢)

Malleable casting before machining (51.7¢)

Cost Cut 15% on Spring Bracket by Using Malleable Producer's Engineering Services

This automotive rear spring bracket was originally a steel stamping, S. A. E. 1015, .438 stock, designed to withstand 800 pounds maximum push or pull load on the shock absorber ear. Casting design experience coupled with use of stress analysis techniques by the foundry's designers reduced weight from 4.2 pounds to 2.9 pounds while increasing the part's yield strength to nearly 3,000 pounds. Result: the pearlitic Malleable bracket performed better . . . cost 15% less!



Cost-Saving Engineering Assistance Available

The kind of engineering assistance that cut costs and improved product quality for these companies and thousands of others is available to you from any of the progressive producers of Malleable castings that are members of the Malleable Castings Council. Start increasing your product profitability right now — contact any of the companies listed below.

Free Information Folder

Your copy of an informative folder, *Data Unit 110—Malleable Castings in the Value Analysis Spotlight*, is available free from the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, or from any member company.

For Quality and Economy...Use MALLEABLE

For Service In Your Area Contact...

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Belcher Malleable Iron Co., Easton

MICHIGAN
Albion Malleable Iron Co., Albion
Auto Specialties Mfg. Co., Saint Joseph
Cadillac Malleable Iron Co., Cadillac
Central Fdry. Div., Gen. Motors, Saginaw

MINNESOTA
Northern Malleable Iron Co., St. Paul 6

MISSISSIPPI
Mississippi Malleable Iron Co., Meridian

NEW HAMPSHIRE
Laconia Malleable Iron Co., Laconia

NEW YORK
Acme Steel & Mall. Iron Works, Buffalo 7
Frazer & Jones Company Division Eastern Malleable Iron Co., Solvay
Oriskany Malleable Iron Co., Inc., Oriskany
Westmoreland Mall. Iron Co., Westmoreland

OHIO
American Malleable Castings Co., Marion
Central Fdry. Div., Gen. Motors, Defiance
Dayton Mall. Iron Co., Ironton Div., Ironton
Dayton Mall. Iron Co., Ohio Mall. Div., Columbus 16
Maumee Malleable Castings Co., Toledo 5
National Mall. and Steel Castings Co., Cleveland 6

PENNSYLVANIA
Buck Iron Company, Inc., Philadelphia 22
Erie Malleable Iron Co., Erie
Lancaster Malleable Castings Co., Lancaster
Lehigh Foundries Company, Easton
Meadville Malleable Iron Co., Meadville
Pennsylvania Malleable Iron Corp., Lancaster

TEXAS
Texas Foundries, Inc., Lufkin

WEST VIRGINIA
West Virginia Mall. Iron Co., Point Pleasant

WISCONSIN
Belle City Malleable Iron Co., Racine
Chain Belt Company, Milwaukee 1
Federal Malleable Company, Inc., West Allis 14
Kirsh Foundry Inc., Beaver Dam
Lakeside Malleable Castings Co., Racine
Milwaukee Malleable & Grey Iron Works, Milwaukee 46

CF&I WIRE HELPS PACKAGED for YOUR PRODUCTION

"CF&I Stem-paks cut machine loading time 80%... give us an extra hour of production every day," stated Mr. Frederick Voos, Plant Superintendent, Risdon Manufacturing Co., Waterbury, Conn.

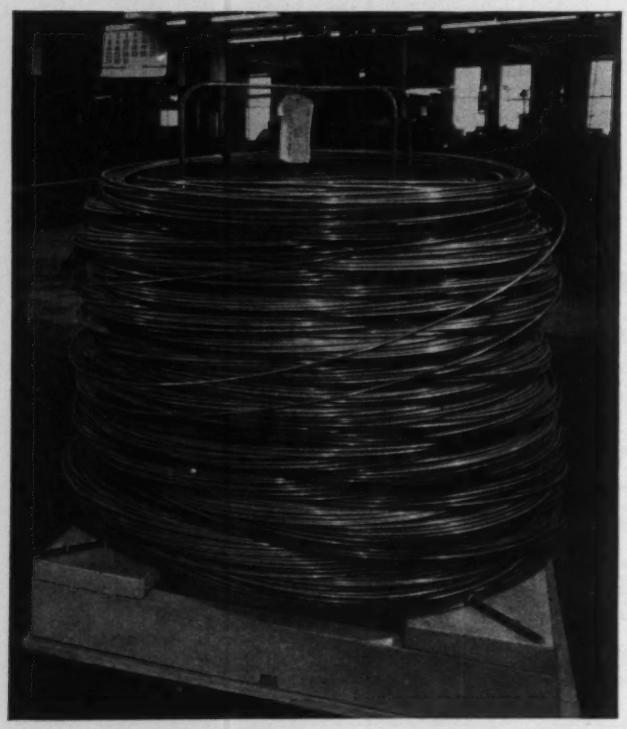
PROBLEM

1. "Our specially designed machines *were* fed wire from coils averaging 150 lbs. Because of the small size, frequent machine loadings were necessary. Each time, the coils had to be loaded by hand and the bindings clipped, after which the wire was guided through the straighteners before entering the machine. We were losing valuable production time due to excessive machine downtime," explained Mr. Voos.

SOLUTION

1. "Our Purchasing Department called a CF&I salesman who carefully examined our operation and recommended that we switch to CF&I Stem-paks which hold up to 1,000 lbs. of one continuous length of wire. Each Stem-pak feeds a machine for an average of one to two days... a production time equal to using seven coils with set-ups in the past.

"Stem-paks give us approximately an extra hour of production per day on each machine," Mr. Voos pointed out. "A Stem-pak can be set up in one-fifth of the time required for the seven coils of wire formerly used... *a saving of 80% on loading time.* The extra hour of production represents a 12½ % increase in the operator's production time."



CF&I Stem-paks are delivered on pallets for fast unloading and easy in-plant handling by fork trucks.

PROBLEM

2. "Part of our operation required the use of wire that was free from rust, grease or dirt. Too often, unprotected coils would collect dirt in transit or storage.

SOLUTION

2. "CF&I Fibre Drums are an ideal answer to the problem of unclean wire. The sturdy Fibre Drum has a metal cover and locking band which seals the drum, protecting the wire from grime and from corrosive elements. In addition, Fibre Drums hold up to 600 lbs. of one continuous length of wire which enables us to run our machines for a longer time than when we used small coils."

Stem-paks and Fibre Drums are just two of nine wire packages that CF&I offers to help make your operation more efficient and economical. When you order from

INCREASE PRODUCTION 12½%

at Risdon Manufacturing Co., Waterbury, Conn.

Risdon Mfg. Co. also uses CF&I Fibre Drums, which hold up to 600 lbs. of wire, for special operations. The sealed Fibre Drums protect the wire against rust and contamination during transit and in-plant storage. Note how closely the Fibre Drums can be placed to the machine and how evenly the wire pays off.

A Stem-pak is easily placed in storage alongside Fibre Drums. No messy storage problems... no chance of coils becoming tangled. Inventory of this neat, compact storage set-up is a quick, simple counting job.

CF&I, you can specify wire *packaged for your production* to give you one or more of these benefits:

- **less downtime through extra-long continuous lengths of wire**
- **compact storage and simplified inventory control**
- **fast unloading and in-plant handling**
- **assured cleanliness of the wire**
- **smooth pay off of the wire**

A CF&I salesman will be glad to assist in selecting the *right* wire package for your operation. There's no charge for this service, so call our nearest sales office today.

CF&I-WICKWIRE WIRE

THE COLORADO FUEL AND IRON CORPORATION

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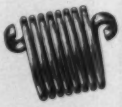

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Answer your "where to get it" questions– by calling on the versatile experience represented by these typical springs and stamped parts. Here is unusual ability to analyze your part from both design and production efficiency and to make cost-saving contributions where possible. Whether your requirements are large or small, routine or extreme precision, you'll get a better brand of service and quality from the best springmakers in the business.

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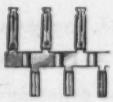

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6003

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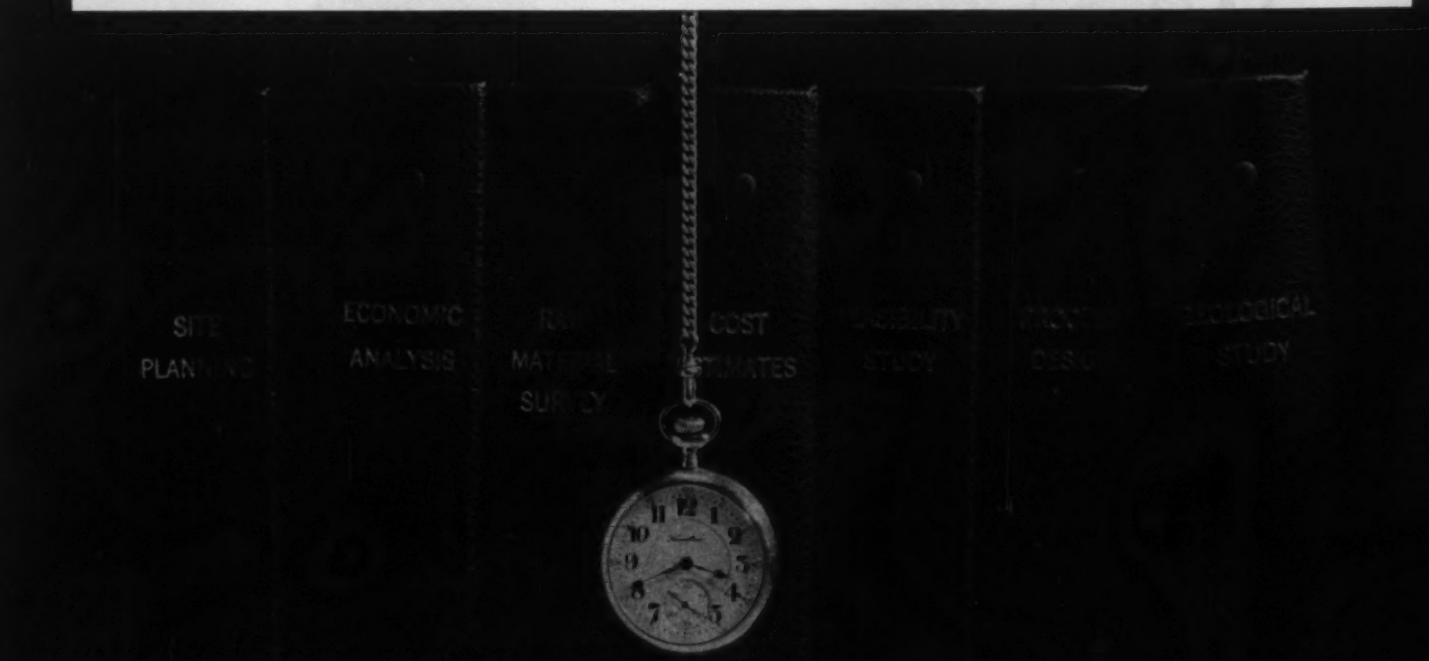
Pre-Engineering by **KAISER ENGINEERS** answers basic plant expansion questions...



Timely? Many complex factors shape the final decision to proceed with your expansion plans...and timing is an important one. Independent analysis of all aspects of your proposed program is the *Pre-Engineering* service offered by Kaiser Engineers. The studies and evaluations furnished by KE Pre-Engineering represent only one phase of total KE services. Kaiser Engineers designs and builds for the Steel industry...offers skilled experience in all types of facilities from raw material plants to finishing mills. From Pre-Engineering through design and construction, Kaiser Engineers provides complete, one-company service and ingenuity based on years of experience.

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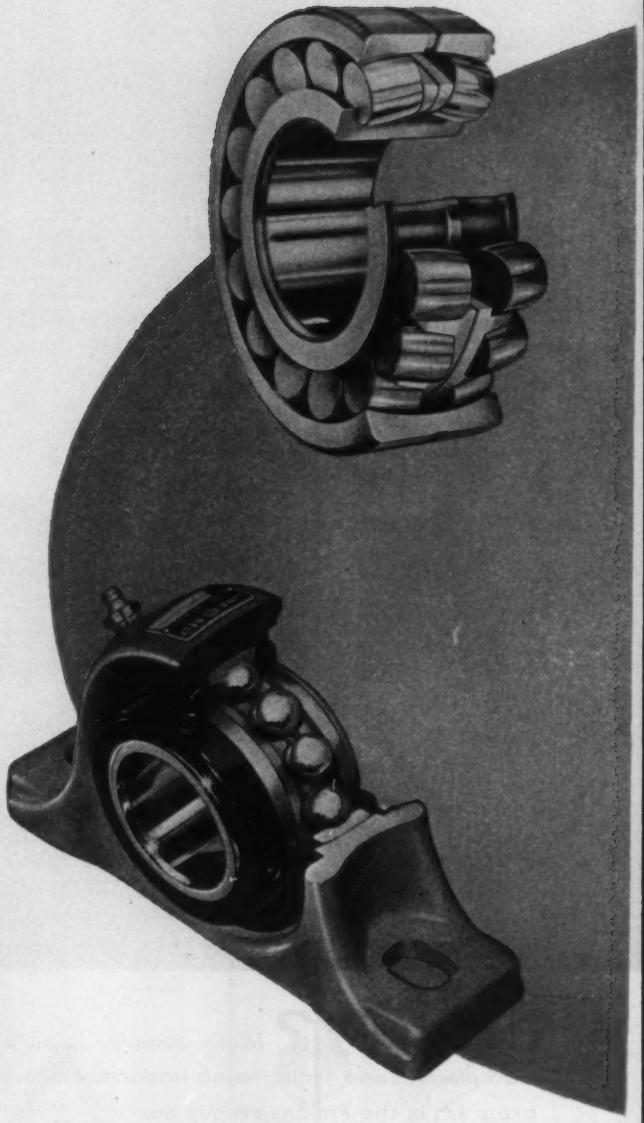
6329-S

Whatever turn shafts may take...



it's easy to match your needs from LINK-BELT's complete line of self-aligning ball and roller bearings

High speeds, low speeds—light loads, heavy shock loads, there's a Link-Belt bearing to keep every shaft turning continuously and economically.

Link-Belt's line of ball and roller bearings, the most complete in industry, includes spherical roller bearings, pillow blocks, and flanged, flanged cartridge, cartridge and takeup blocks. All have industry's *preferred* bearing features and all have won the reputation of "the designers' choice."

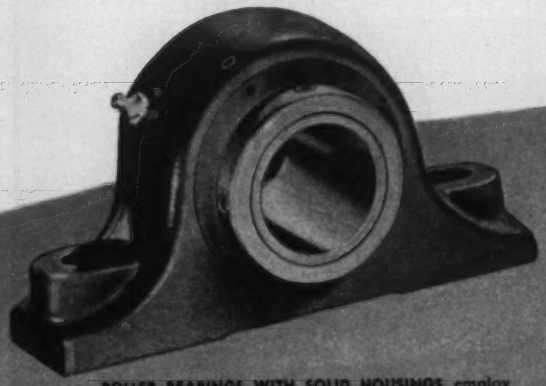
Link-Belt self-aligning ball and roller bearings compensate for inaccuracies in fabrication and assembly of equipment while maintaining full load capacity throughout their long life. Their compactness promotes simplicity of machinery design—their easy mounting reduces installation costs.

Available from local stocks; contact your nearest Link-Belt office or authorized stock-carrying distributor. Look under BEARINGS in the yellow pages of your phone book. Ask, too, for Book 2760 and 2550-C containing full information on the complete Link-Belt ball and roller bearing line.

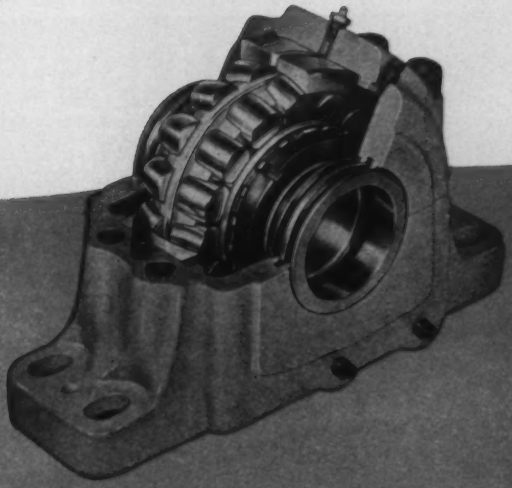
LINK-BELT

SELF-ALIGNING BALL AND ROLLER BEARINGS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney) Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 15,413



ROLLER BEARINGS WITH SOLID HOUSINGS employ heavy-duty, double-row self-aligning roller bearings. Available with cast iron or cast steel housings. Choice of seals to match operating conditions. Compact, rugged and easy to install. Series 400, for ¾" to 4" shafts.



SPHERICAL ROLLER BEARING PILLOW BLOCKS feature Link-Belt's *new Spherical roller bearings* in sturdy cast iron or super-rugged cast steel housings. Designed for either adapter or direct shaft mounting. Choice of rugged steel multi-labyrinth or Dacron contact seals. For shafts from 1 7/16" to 10 1/4".

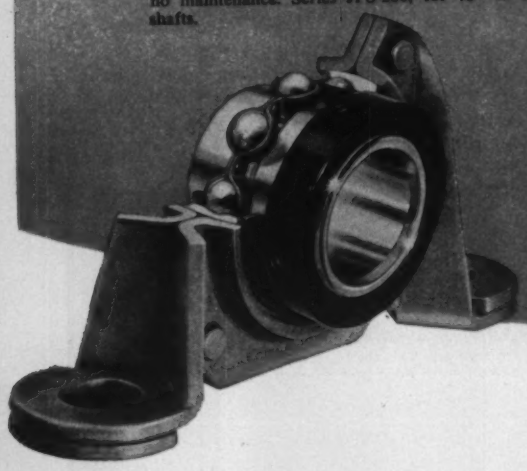
NEW SPHERICAL ROLLER BEARINGS combine all the best features of modern bearing design: precision-machined, centrifugally cast bronze retainers; big, highest-capacity rollers; high, heavy inner race flanges. Bearing bores from 40 mm (1.5748") to 220 mm (8.6614").

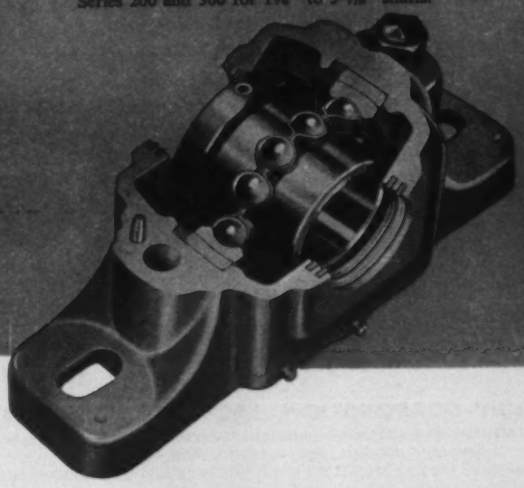
ALSO AVAILABLE FROM LINK-BELT'S COMPLETE BALL AND ROLLER BEARING LINE

BALL BEARINGS WITH SOLID HOUSINGS feature self-aligning, single row, deep groove ball bearings. Precision balls operate on honed raceways assuring smooth, quiet operation. Spring locking collars simplify installation . . . lock bearings securely to shaft. One piece housings are compact, require minimum support space. Series 200 and 300, for ½" to 4" shafts.

BALL BEARINGS WITH PRESSED STEEL HOUSINGS come completely assembled, ready to install. These low cost, dependable pillow blocks have self-aligning bearings to compensate for mounting inaccuracies. Spring locking collars assure tight fit on shafts. Lubricated for life, these bearings require no maintenance. Series JPS-200, for ½" to 1 7/16" shafts.

BALL BEARINGS WITH TWO-PIECE HOUSINGS provide ease of installation, simplify bearing and lubricant inspection. Large reservoir for oil or grease makes them ideal for high speed applications. Bearings are self-aligning to compensate for shaft misalignments. Series 200 and 300 for 1 1/16" to 3 15/16" shafts.



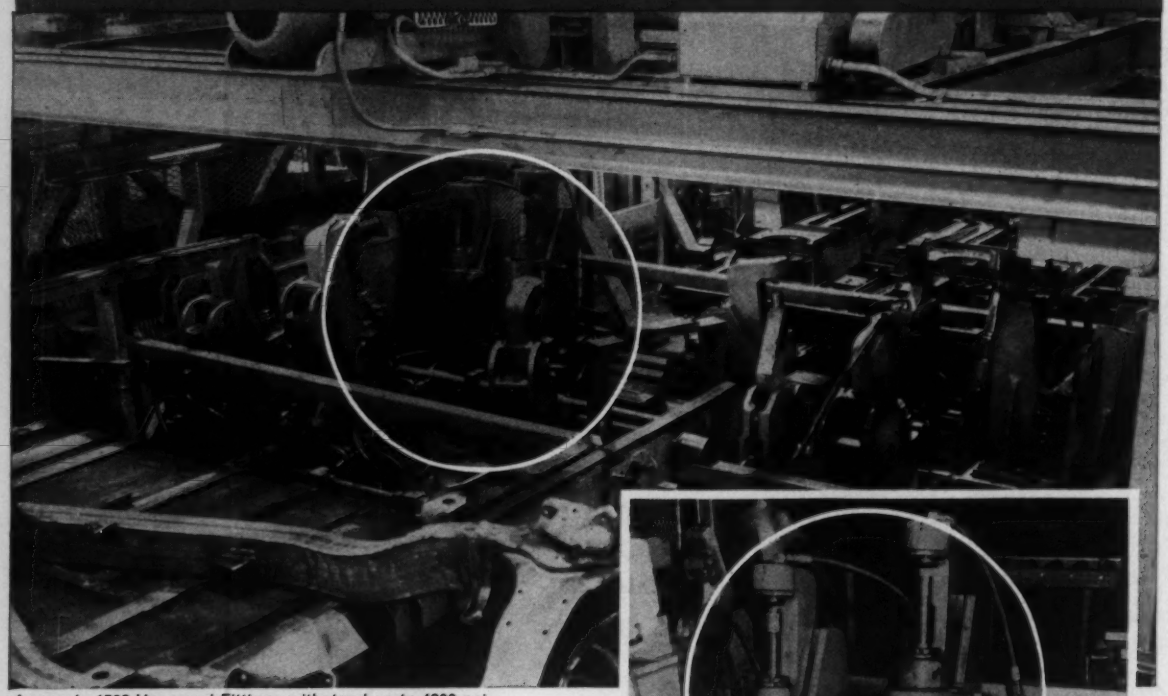


For 4800 psi PRESSURE SURGES

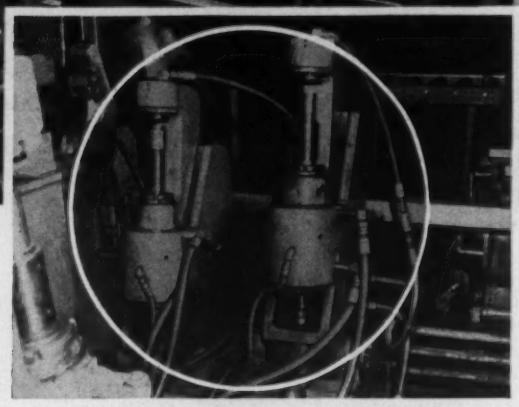
Tool Engineer Specifies

Aeroquip *Hose Lines and Reusable Fittings*

From job report by large automotive plant producing auto frames and stampings



Aeroquip 1508 Hose and Fittings withstand up to 4800 psi on this body bolt piercing machine.



The experience of this tool engineer has proved that a bulk stock of Aeroquip Hose and Reusable Fittings can expedite the design and maintenance of automated production machinery such as automatic body bolt piercing machines. In this application Aeroquip Very High Pressure Hose, under constant flexing and pressure surges up to 4800 psi, helps avoid down-time and keeps production running smoothly.

When infrequent Aeroquip Hose replacements are required they can be made on the job, quickly, easily and with minimum down-time. Hose can be cut as needed, no special tools are required. Fittings can be reused. Result—fewer and briefer interruptions to work flow.

Your Aeroquip Distributor is a fluid line specialist. He will give you a copy of our industrial Catalog No. 204 and explain why you are in good hands when you consult with Aeroquip. Call him. His telephone number is in the "Yellow Pages" under "Hose."

Aeroquip is so easy to use—your inventory is just a few feet of hose and a handful of fittings.

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National's electric furnace facilities for steel roll production are among the most modern in the industry. Furnace sizes, molding facilities, annealing equipment; all have been selected to provide the close metallurgical control needed at every step to produce high quality rolls that give long tonnage life.

This custom service extends to every roll order produced by National, whether steel, nodular iron, or iron. Since rolls are our only business, every phase of our operations is staffed with men who know *their* business, and how it affects *yours*.

We'd like to have you meet some of these men. The best way is to plan a visit to our modern plant at Avonmore. But if time prohibits this, let us send you a brochure that will tell you more about why . . .

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Somewhere North of Baffin Bay

The Arctic is almost as silent and lifeless as an ice-cube. But, deep inside it, these 400-foot long missile-detection antennas will guard the life of our country.

They're part of a Ballistic Missile Early Warning System (BMEWS). Officially, you'd call them surveillance radar antennas. Yet, they look like over-sized baseball mitts. That web-like framework can detect (or spot) a far-off missile darting through the shivering Arctic sky, and rifle its speed and direction to any of our military bases in seconds.

Up here, weather is a constant battle. Arctic storms slam into the 163-foot high antennas, and rake icy fingers back and forth over the mesh-faced structures. But they'll stand for years. The D. S. Kennedy Com-

pany, builders, made certain of that by weaving foot after foot of USS National Seamless Carbon and Nickel Alloy Tubing into every antenna.

For over 90 years, USS National Pipe and Tubes have been used for demanding tubular installations in the fields of line pipe, pressure tubing, mechanical tubing, structural pipe and oil country tubular products. Would you like to benefit from our experience? Write National Tube Division, United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS and National are registered trademarks

This mark tells you a product is made of modern, dependable Steel.

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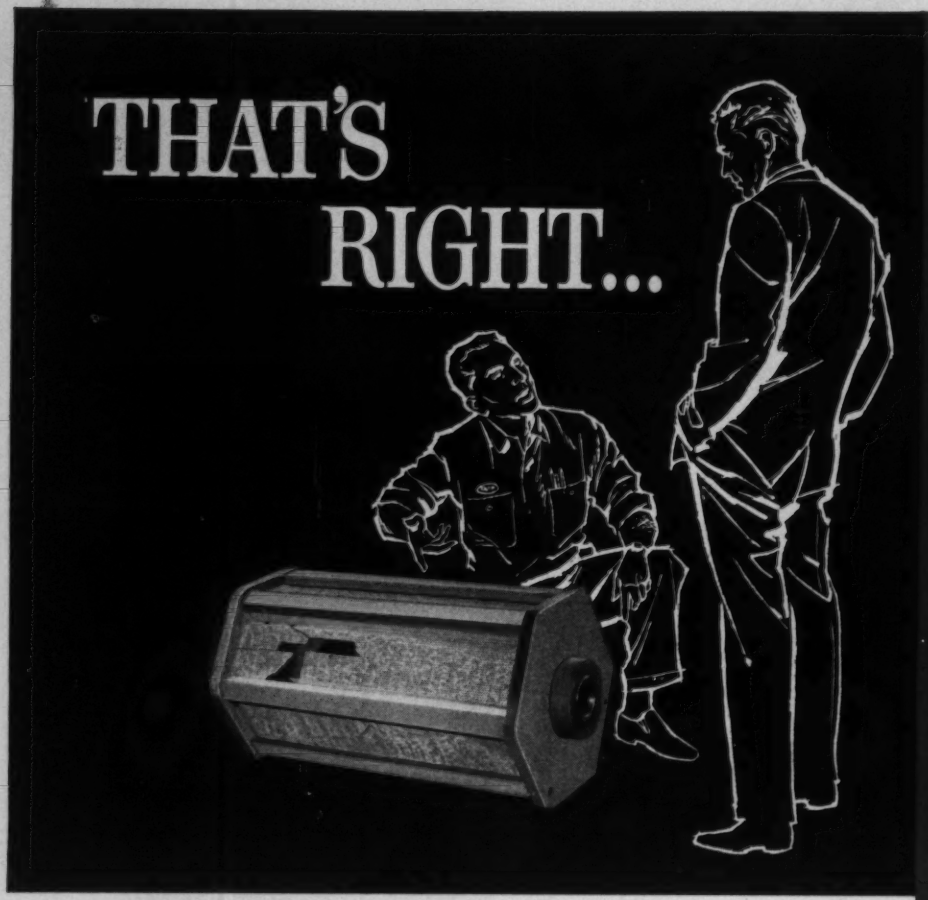

world's largest plating supplier

udylite

This cylinder will be repaired and back on the line in about 20 minutes

The New Udylok Plating Cylinders are completely field-repairable. Handy replacement parts can be inserted and the barrels returned to productive use in less than half an hour.

Ruggedly durable and dependable, Udylok is highly wear resistant under any normal use . . . yet easily repaired if damaged by accident. Its unique, interlocked, cementless construction is responsible.

There's no metal to plate in the entire cylinder . . . and *no tie rods* to corrode, rattle loose or get in the way. Parts are quickly available from Udylite or easily carried in your stock, ready for instant repairs.

Specify Udylok cylinders in all your new equipment and use them as replacements in old-style barrel units too. Let your Udylite man show you how you can apply these important economy features to *your* operation today:

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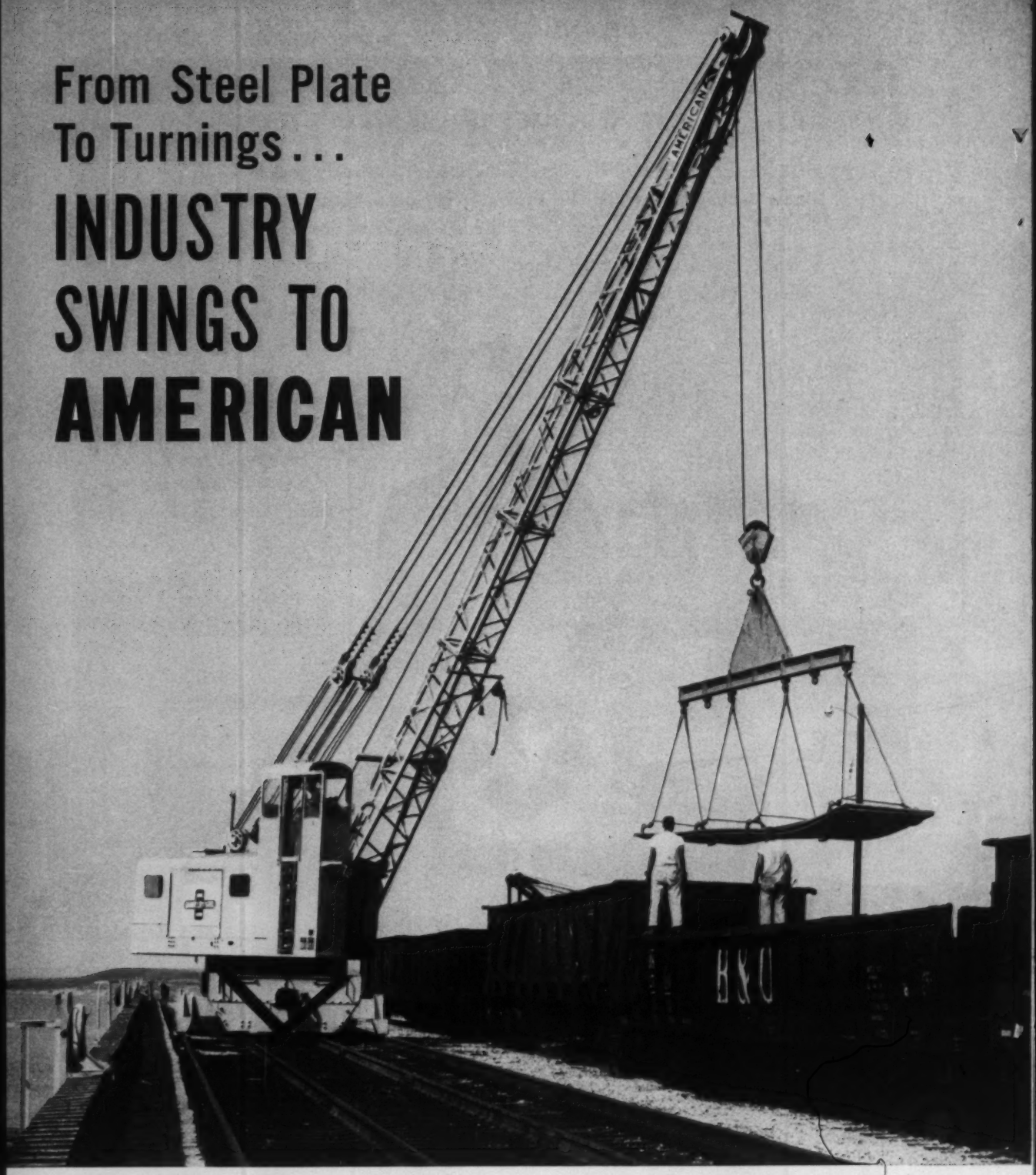

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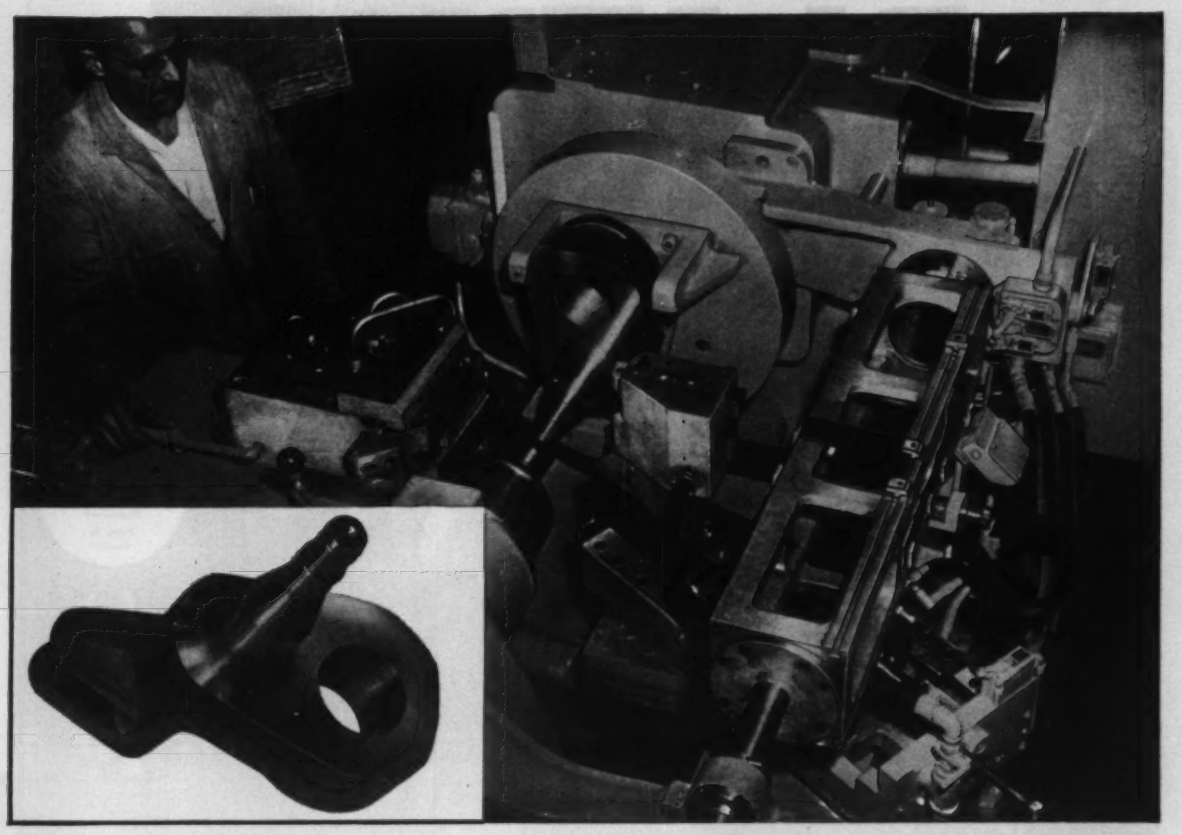

Whips problem part with right equipment

Handles tough, interrupted cut and contour machining easily with Gisholt No. 24 Automatic with JETracer

Here's how this producer is holding floor-to-floor time on military tank idler arm forgings—18″ long with 5½″ major radius—to just 21.1 minutes.

The job is done with the powerful Gisholt No. 24 Automatic Production Lathe, using a JETracer on the rear independent slide, plus a 2-speed motor for correct machining speeds when facing and turning.

With the part held between centers, a special face plate fixture locates the work and drives against the large O.D. radius. All cuts are made separately; each slide performs a rough and finish pass. The front tool slide faces at 60 r.p.m. and .015″ feed (306 f.p.m.) and has automatic tool relief. Two tools divide the length of cut to shorten machining time. A special step-over cam arrangement repositions the front carriage and its tools for the finish pass.

The JETracer uses a 4-position indexing cam roll (permitting up to 4 automatic passes if needed), and controls the rear slide which turns all diameters on the idler arm at 180 r.p.m. and .015″ feed (259 f.p.m.).

Whatever your production picture on large parts—long steady runs or small repeat lots—you'll find proven ways to cut costs with the Gisholt MASTERLINE No. 24 Automatic Production Lathe. One operator handles 2 or more of these powerful machines, or does other jobs during machining time, because all machine functions are automatically controlled. Setups and change-overs are fast and simple.

For complete details on the No. 24 and other Gisholt machines, call your Gisholt Representative today. He has the facts, and his wide experience may point the way to more profitable production in your plant.

MASTERLINE GISHOLT SINCE 1887 GISHOLT

GISHOLT MACHINE COMPANY

Madison 10, Wisconsin, U.S.A.

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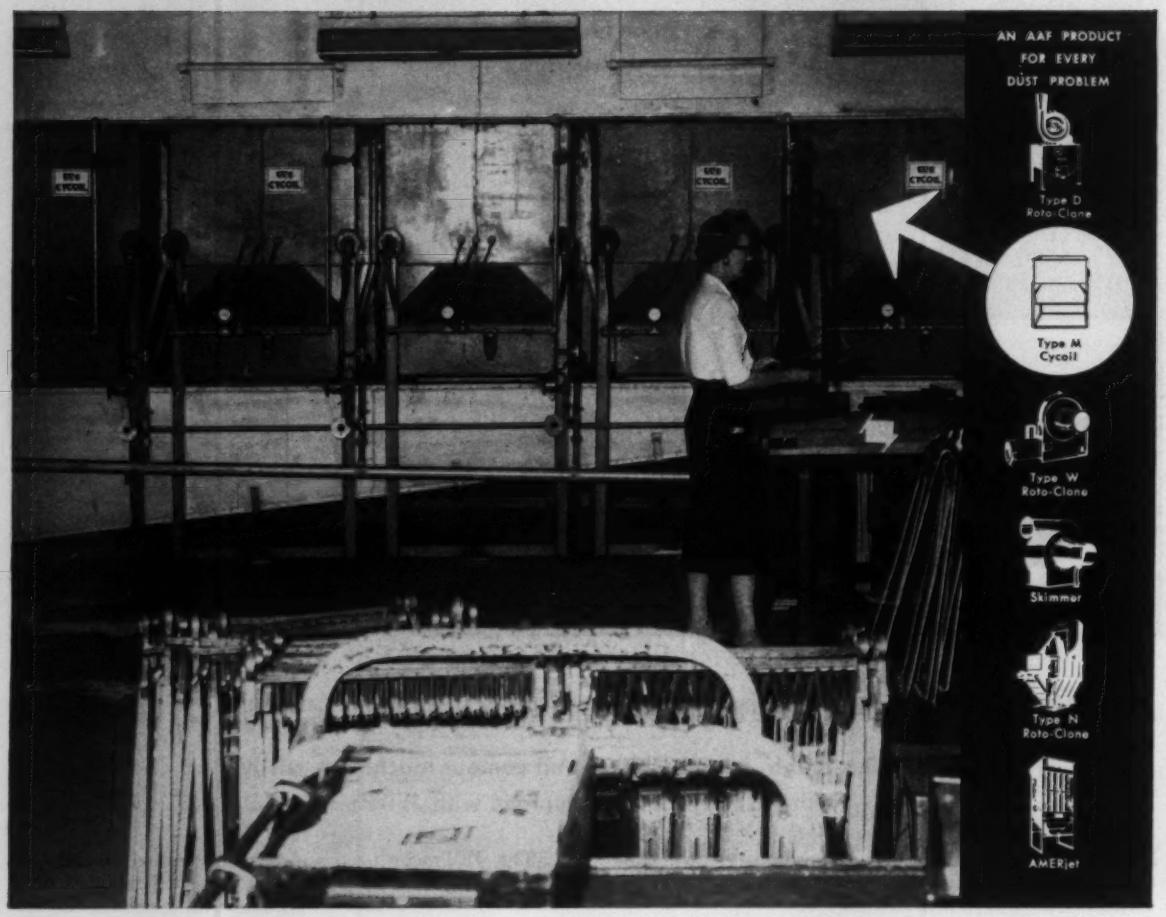
PLATING



AAF Type M Cycoils eliminate fumes from small parts plating at Burroughs

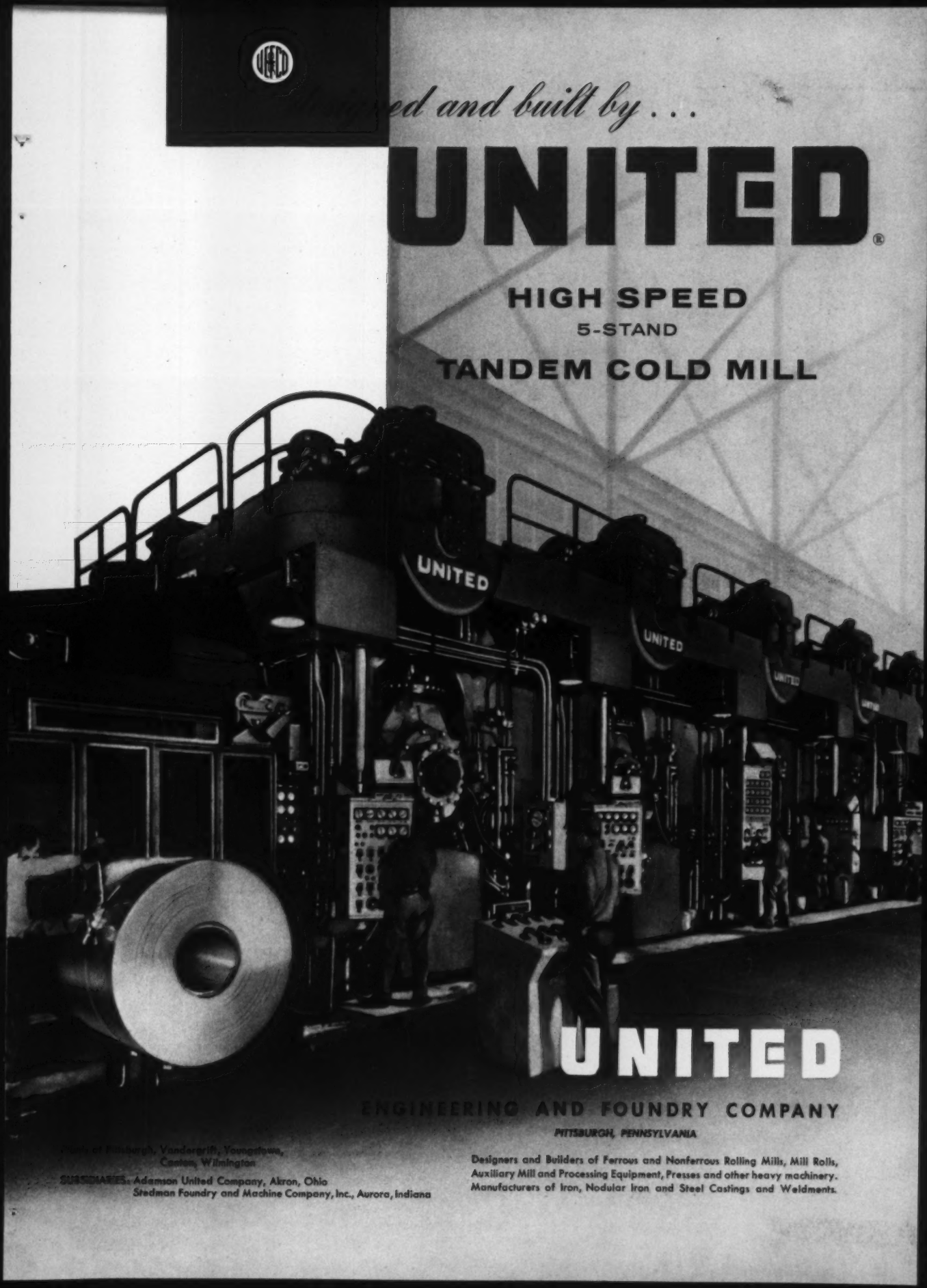
● Burroughs had a fume problem resulting from inadequate make-up air and heavy fume loading from tank agitation. Their answer: a ventilating system built around new units designed *specifically* for plating fume collection—AAF Type M Cycoils. These units achieve higher collection efficiencies than conventional collectors, yet are lighter, less bulky and lower in cost.

AAF's complete line of dust control equipment was application-developed, now challenges *any* metalworking dust problem, regardless of the metal. Where are dust, fumes or mists causing you trouble—grinding, buffing, polishing, plating, dry machining, wet machining, heat treating, abrasive cleaning? All can be effectively and economically controlled by AAF.

For the answer to your plating fume problem, call your local AAF representative, or write for Bulletin 286. Address: Mr. Robert Moore, American Air Filter Company, Inc., 443 Central Avenue, Louisville, Ky.

AAF American Air Filter

BETTER AIR IS OUR BUSINESS



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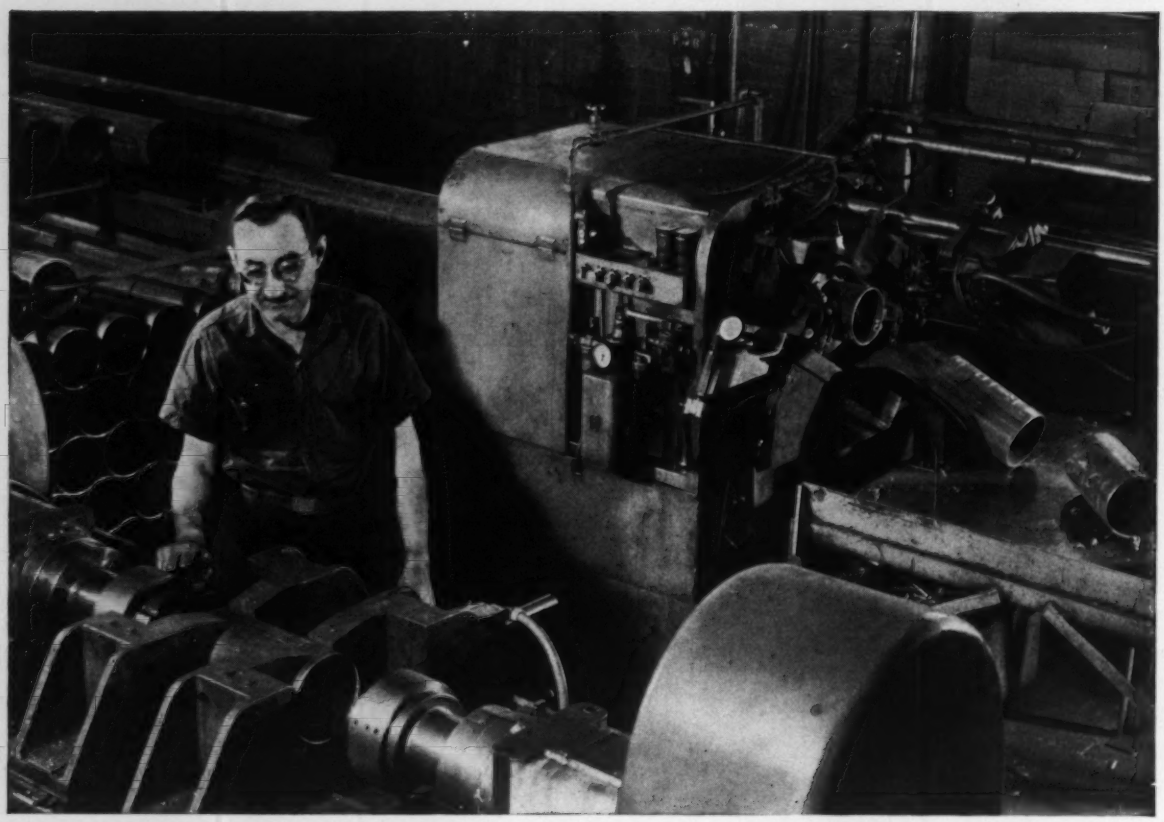

Tubing for this job must meet the most rigid specs

This manufacturer of heavy-duty idler rollers has turned to increased automation and tighter material specs to improve production. Note automatic feed and cutoff of tubing in background . . . the quick setup for double-end counterboring at the next station.

Tubing for this job must meet highest standards for uniformity of size, straightness and close tolerance of concentricity. But where do you find large O.D. tubing to meet these rigid specs? At Ryerson, of course—home of the industry's tightest quality controls.

Here you choose from the nation's largest stocks. And you're assured of consistent quality that is so important to meet the demands of automation. The more automated your production line, the less chance for visual inspection, and the more dependent you are on the consistent quality of the raw material.

So when you next need tubing or help with selection and application problems, be "Metalogical"—call Ryerson.

The type of tubing you need is here

Carbon Steel Tubing—seamless and welded, round and square, cold drawn and hot finished.
Alloy Steel Tubing—seamless rounds.
Fluid Power Tubing—Rockrite cylinder finish, seamless and welded; hydraulic fluid line; seamless and welded cylinder tubing.
Structural Tubing—square, rectangular and round.
Ledloy® 170 Tubing—fast machining, 170 sfm.
Stainless Pipe and Tubing—cold drawn seamless and welded. Also welded ornamental.
Aluminum Pipe and Tubing—all commonly used alloys and tempers.
PVC Pipe and Tubing—time-tested Ryertex®-Omicron PVC.

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RYERSON STEEL

Joseph T. Ryerson & Son, Inc., Member of the INLAND® Steel Family

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Homer Is Bethlehem Chairman; Martin Becomes President

Arthur B. Homer, 64 (left), president of Bethlehem Steel Corp., and its principal subsidiary, Bethlehem Steel Co., since 1945, was elected chairman of both firms last week. He continues as chief executive officer. The new president of the corporation is Edmund F. Martin, 58, who has been with Bethlehem since 1922. He was a member of the first Bethlehem class in management training for college graduates. An engineer by training, a production man by experience, Mr. Martin became general manager of the Lackawanna (N. Y.) plant in 1950 and vice president-operations, Bethlehem Steel Co., in 1958. Both men have been with Bethlehem since the beginning of their careers.

Pittsburgh Steel's Incentive Pay Dispute

As STEEL went to press, representatives of Pittsburgh Steel Co. and the United Steelworkers were trying hard to head off a strike called for midnight Saturday (Aug. 6). The strike action followed the company's announcement that it would institute incentive pay cuts proposed during negotiations last January. Union locals rejected a compromise proposal worked out by a union-company committee under terms of the contract. The company says incentives hike its manhour costs 46 cents above the industry average.

9 Cents—Average Wage Hike This Year

The average wage increase won during the first half of 1960 by unions was 9.2 cents, reports the Bureau of National Affairs Inc., Washington. For manufacturing, the figure averaged 8.2 cents. Deferred increases figured in half the 1800 contracts studied. Three of every 100 settlements left wages unchanged. Here's the median settlement (in cents per hour) for several metalworking industries:

Aircraft & parts	6.3	Instruments	9.0
Electrical machinery & equipment	8.1	Rubber products	8.0
Iron & steel	7.0	Stone, clay & glass	7.2
Machinery (except electrical)	8.8	Construction	14.7
Nonferrous metals	8.4	Trucking & warehousing	11.9

Exports Up in First Half

Preliminary figures from the Census Bureau show that U. S. exports during the first half of 1960 totaled about $9.6 billion—up 21 per cent from the $7.9 billion performance in the like 1959 period.

Industry Sales Reports Mixed

Used machine tool sales in June rose 4.5 per cent above the volume for the year-earlier month, but declined 4 per cent from the May, 1960, figure, says Machinery Dealers National Association . . . First half orders for

industrial heating equipment, despite a June setback, are up 1 per cent from the 1959 pace, says Industrial Heating Equipment Association; export orders during 1960's first half are up 145 per cent from the level of 1959's first half . . . Gas Appliance Manufacturers Association compares first half, 1960, shipments, with those of 1959's first six months: Gas fired furnaces —down 8.4 per cent; gas ranges—down 4 per cent; gas water heaters—down 12.4 per cent; gas incinerators—up 19 per cent; gas clothes dryers—up 1.3 per cent.

PAs Report Summer Doldrums

The latest survey of the National Association of Purchasing Agents (comparing July with June) finds: Production—22 per cent say better; 30 per cent worse. New orders —24 per cent say up; 36 per cent down. Prices—5 per cent say up; 13 per cent say down. NAPA comments: "Prices are softer now than they have been for many months, and good buys are available with a little shopping." Inventories—33 per cent say they'll reduce further; 15 per cent are building; a typical comment: "We're holding the line at minimum levels." Employment—18 per cent say up; 28 per cent down.

Japan Floods U. S. Electronics Market

Japan shipped $16 million worth of electronic products into the U. S. during the first quarter—almost double the total in the like 1959 period. The big gainers: Transistors—up 1059 per cent; receiving tubes—up 383 per cent; speakers—up 233 per cent; sound equipment—up 301 per cent.

Russia Adopts Capitalistic Tactics

S. J. Rundt, consultant on international business, reports that Russian consumers are becoming more selective. Goods not to the public's taste in style or quality remain unsold—a new trend. Stores are now appealing to customers with installment plans. And a "buyer's market" is developing in several fields. "Competition is brewing in the Marxist paradise," says Mr. Rundt. Even *Izvestia* and *Pravda* rival one another; *Izvestia* has pushed up the time it hits the street to score occasional beats. Retailers have been given the right (experimentally) to return sluggish goods to the manufacturers.

17 Labor Markets Get Government Contract Preference

Government contract preference to labor surplus areas, practiced since 1952, has been expanded to give priority to "persistent surplus labor areas." Commerce Clearing House, Chicago, lists the 17 major areas: Evansville and Terre Haute, Ind.; Fall River, Lawrence, Lowell, and New Bedford, Mass.; Detroit; Atlantic City; Altoona, Erie, Johnstown, Scranton, and Wilkes-Barre-Hazleton, Pa.; Providence, R. I.; Charleston, Huntington-Ashland, and Wheeling, W. Va. Also, 71 smaller areas were given the same designation.

Eye in the Sky Will Help Guard Nation

This optically perfect reflector is designed for airborne radiometers, will give the Navy another eye in the sky for our defense. Built by Heyer-Shultz Inc., Cedar Grove, N. J., it's made of a special cobalt-base metal, Haynes Stellite Co.'s alloy No. 25. Haynes has just announced another alloy, No. 56, blended from nickel, cobalt, chromium, molybdenum, and iron. It has high resistance to oxidation up to 1900° F, is easy to fabricate, has good tensile strength at high temperatures.

Using County Market System? Check Revised Figures

Metalworking market planners will have to revamp their thinking on which counties to give the most sales emphasis. Reason: 1960 census figures show 1580 of the nation's 3072 counties lost population during the last decade, despite the 27 million population gain registered in the nation as a whole.

U. S. Now Has 50 Persons Per Square Mile, with Alaska

The population density of the U. S. is 50.4 persons per square mile—counting Hawaii's 97 per square mile and Alaska's one person for each 2½ square miles. For the 48, density is 57 persons per square mile vs. 50.7 in 1950. Densities for "crowded" states:

New Jersey	800.2	Maryland	311.3	Michigan	136.4
Rhode Island	798.7	Pennsylvania	249.3	Indiana	128.1
Massachusetts	650.1	Ohio	235 0	California	99.2
Connecticut	513.3	Delaware	224.0	Virginia	97.7
New York	346.2	Illinois	179.0	Hawaii	96.8

Fringe Benefits Climb Higher

Fringe benefits claimed 24.6 per cent of the payroll in 100 companies studied by the U. S. Chamber of Commerce. For the same companies, the figure was 14.7 per cent in 1947 and 23.8 per cent in 1957. In the average company last year, fringe benefits accounted for 22.8 per cent of payroll, a Chamber survey of more than 1000 firms shows. The range: From less than 6 per cent to more than 60 per cent. Four firms paid less than 10 cents an hour; 33 paid $1 or more. The Chamber report is available for $1.

Nation's Trade Policy Is Obsolete, Committeeman Asserts

"The trade policy of the last 25 years has been made obsolete by domestic and foreign developments. It is now badly out of focus with the competitive realities of the world." That's what O. R. Strackbein, chairman, Nation-Wide Committee on Import-Export Policy, told the Republican Platform Committee. He pointed out that leading foreign countries have installed "tens of billions of dollars worth of advanced machinery and equipment, have adopted modern mass production techniques, are improving their technology,

and are gravitating toward mass markets." Their wages continue low and the productivity gap between them and this country has narrowed visibly, he asserts, urging a change in our foreign trade laws.

1960 Construction to Tie '59 Mark

Look for new construction expenditures this year to total $55.8 billion—about equal to last year's record, predicts the Commerce Department. It estimates 1960 housing starts at 1.36 million units. Comparison by categories:

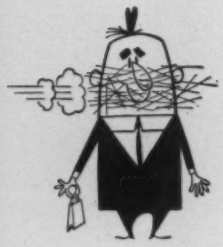
(In billions of dollars)	1959	1960
PRIVATE construction	$39.85	$39.83
Residential (nonfarm)	24.47	22.93
Nonresidential	8.86	10.08
Industrial	2.11	2.70
Commercial	3.93	4.20
Other	2.82	3.18

	1959	1960
PUBLIC construction	$16.19	$16.00
Residential	0.96	0.83
Nonresidential	4.50	4.55
Military facilities	1.46	1.23
Highways	5.89	5.80
Sewer and water	1.47	1.53

German Mill Goes to Continuous Casting

Schloemann AG, Dusseldorf, and Concast AG, Zurich, will build a vertical, continuous casting unit for the Dillingen Steelworks, Dusseldorf. It will produce slabs up to 8 by 60 in., to be turned into plate mill products and strip. The plant is scheduled to begin operating early in 1961.

Straws in the Wind



The Commerce Department predicts that shipments of air conditioning and refrigeration equipment this year will exceed those of 1959 by 10 per cent . . . Industry savings via gamma radiography may hit $80 million by 1963, predicts Dr. A. J. Stevens, president, Radionics Inc., Norristown, Pa. . . . Fishing tackle manufacturers, in a move to counter foreign competition, spent an average of $234.39 per employee last year on new product development; Space Age industries like electronics, computers, jet engines, rocket parts, and plastics, spent about $688.77 per employee. So says Associated Fishing Tackle Manufacturers . . . Westinghouse Electric Corp. and two European associates will build a 242-megawatt atomic power plant at Chooz, France . . . The Defense Department has revised its Directory of Metalworking Machinery, listing 80,000 machine tools. It's available for $7.50 from Cataloging Div., Armed Forces Supply Support Center, Washington 25, D. C.

Metalworking Pulse

The Business Trend: The 2 point gain in STEEL's industrial production index in the week ended July 30 marked the third consecutive rise. With automotive changeovers canceling out advances elsewhere, the index should be steady to lower for the next few weeks. **Autos:** All Chrysler, American Motors, and Studebaker-Packard plants are shut down for model changeover. The cutbacks will increase. **Steel:** Output rose for the fourth consecutive week, reaching 1,570,000 tons.

- **INDUSTRIAL PRODUCTION**
  - Week ended July 30 . . . . 154†
  - Year ago 152
  - Details on Page 73
- **PASSENGER CAR PRODUCTION**
  - Week ended Aug. 6 . . 95,000*
  - Year ago 108,240
  - Details on Page 70
- **INGOT PRODUCTION RATE**
  - Week ended Aug. 7 . . 55.1%†
  - Week ago 53.3%
  - Details on Page 128

†Preliminary. *Estimated.

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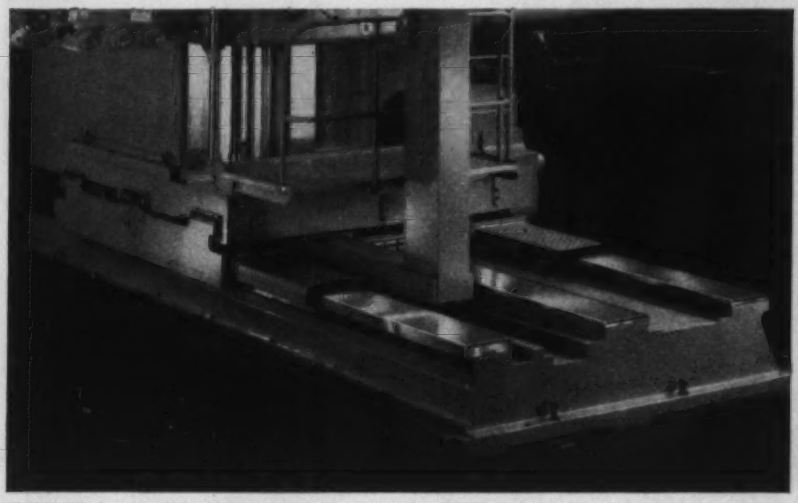
O-KNI-CO

METALWORKING news

PRODUCTION FACTS THAT INCREASE YOUR PROFITS

PUBLISHED BY THE OHIO KNIFE CO., CINCINNATI, OHIO



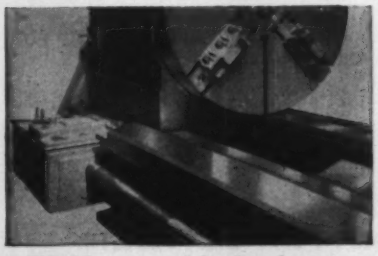
O-KNI-CO hardened bedways, cross ways on new GRAY 650 FC horizontal boring machine.

Big machine tool builders solve wear and accuracy problems with quality O-KNI-CO processed hardened ways and wear plates

The G. A. Gray Co., The Niles Tool Works of the Baldwin-Lima-Hamilton Corp., The Gisholt Machine Co. are among the many users of O-KNI-CO products.

By a time proven process, special analysis tool steel of any thickness is eternally bonded to a soft, tough, easily machinable steel, producing a superior way that will not warp or bow. Special O-KNI-CO hardening process (65-66 Rockwell C) to the full depth of the tool steel, along entire length of the way, develops amazing wear-resistant qualities.

Ordinary ways of one type steel, are usually heat treated by flame hardening, carburizing, or some similar process. This results in variations of depth and quality of hardness along the length of the way. The degree of hardness is usually well below the minimum standard (63 Rockwell C), necessary to eliminate galling, scoring and excessive wear. These conditions destroy the accuracy of the machine almost from the first day of operation, requiring continuous compensations in positioning of work.



O-KNI-CO processed hardened ways on 60 inch lathe made by The Niles Tool Works.

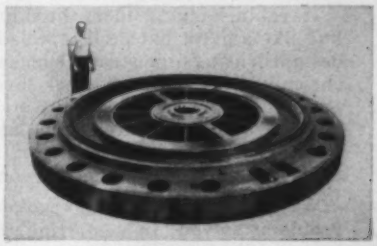
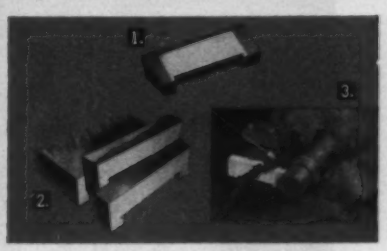


Table of Niles 20 foot vertical boring mill, inverted to show O-KNI-CO wear plates.

O-KNI-CO processed hardened ways are carried in stock in a variety of sizes and shapes, or made to suit your specific requirements. They are a perfect mating surface for either metal or non-metallic bearing surfaces. O-KNI-CO processed clad aluminum bronze wear plates are made by the same process and are available in standard stock sizes for quick delivery.

Gisholt Machine Co. gives amazing demonstration to prospective lathe buyers

Prospective lathe buyers witnessed an amazing demonstration of OK Bedway hardness at The Gisholt Machine Co., Madison, Wisconsin. Gisholt uses OK Ways exclusively on their ram and saddle



turret lathes, and to prove their quality they (1) took a section from an OK Bedway, (2) made it into a tool bit, (3) locked it in a fixture and cut spiral shavings from 1045 cold-rolled steel.

Ohio Knife Co., big supplier of shear blades to equipment builders

Special O-KNI-CO heat treating techniques applied to shear blades give maximum toughness and superb edge holding qualities. Various grades are available for shearing. OK Battle Axe blades shear up to ¼" mild steel, OK Dura-chrome blades for shearing hot or cold plate up to 1¼" and OK Utility blades for short runs and heavy plate.

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THE OHIO KNIFE CO., Dept. 66-AF

Cincinnati 23, Ohio

Gentlemen: Please send me free copy of:

- ☐ HARDENED WAYS—Seven Cross Sections in over 60 sizes.
- ☐ SHEAR BLADES.
- ☐ SLITTING—A Basic Guide for the New Operator.

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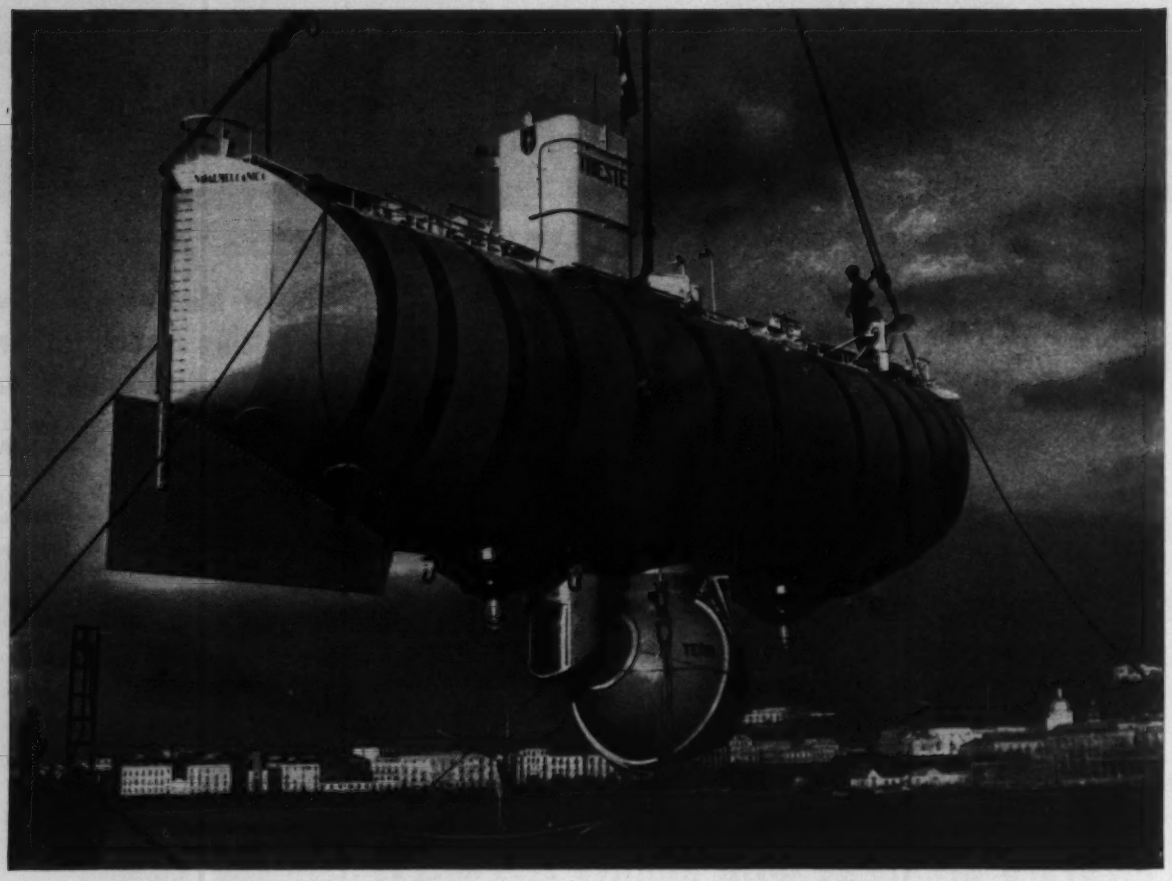


Bathyscaph "Trieste", looking like something straight out of Jules Verne, has already made more than 50 scientific voyages to the ocean depths. High-strength nickel-chromium-molybdenum steel protects occupants of spherical cabin from underwater pressures up to 1100 atmospheres, or more than 16,000 pounds per square inch.

Built to explore an unknown world

How nickel alloy steel guards explorers against the crushing pressures of ocean depths

The bathyscaph, a deep-sea vessel, was invented by the Swiss professor, Auguste Piccard, who in the past years has built two: the first one was FNRS 2; its steel cabin is now used by the French Navy (FNRS 3). The other one is "Trieste", now property of the U. S. Navy.

"Trieste" has been down 65 times and recently set a new world's record by descending 35,805 feet below the surface of the Pacific Ocean.

At these depths, water pressure would crush a conventional submarine. But the bathyscaph is not so vulnerable...

Its cabin, hanging under the ship's hull like a giant bubble, is specially designed, using high strength nickel-chromium-molybdenum steel three and a half inches thick. This steel bubble, weighing eleven tons and nearly seven feet in diameter, is large enough to hold two men in comfort – *and safety.*

Problems solved. In perfecting the bathyscaph, its designers naturally ran into many problems. But one by one they overcame their difficulties. And quite often it was with the help of Nickel...

This is especially true of the Nickel which is part of the nickel-chromium-molybdenum steel of the cabin. They have Nickel, too, in the stainless steel of vital instruments, among them those in the ballast releasing system. And they also use Nickel in electrical resistances which operate as thermometers for water temperature.

A metal of many uses. Either alone or with other elements, Nickel improves hundreds of alloys, making possible almost any desired combination of properties for meeting specific fabricating or service demands.

Do you have a metal problem? One that involves corrosion... stress... fatigue... high or low temperatures or some other troublesome factor? A nickel-containing material may provide *your* answer.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N.Y.

INCO NICKEL

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

Autos: Round 2 Coming Up!

Last week, the first 1961 Buicks and Plymouths rolled off the assembly lines to start Round 2 in the auto industry's battle for markets.

It won Round 1 by a slight margin.

This year, the industry will produce about 6 million cars with a wholesale value of around $11 billion. The top five companies will have sales of more than $20 billion.

The industry won Round 1 by introducing four new compacts and economy versions of standard size cars.

As of July 30, the Big Three had built 913,233 compacts, including 393,168 Falcons, 242,911 Corvairs, 187,809 Valiants, and 89,345 Comets. The Dart helped Dodge more than double 1960 production to 265,000 units.

Those cars, plus the Rambler and Studebaker, no doubt have contributed to a reduction in foreign car registrations this year. (The count is down to 45,500 units a month from 46,800 in 1959.)

The new, 1961 compacts will help in Round 2, but a warning is in order. The new cars will be longer and more powerful than their 1960 counterparts. They could spark another horsepower race, resulting in a reversion to leviathans that few people want.

In winning Round 2, and those that follow, the auto industry must be flexible enough in its thinking to keep up with the ever changing needs of the market place.

As of now, car buyers favor the current de-emphasis of size and gadgetry. They're putting new emphasis on accessibility and resistance to corrosion and mechanical failure.

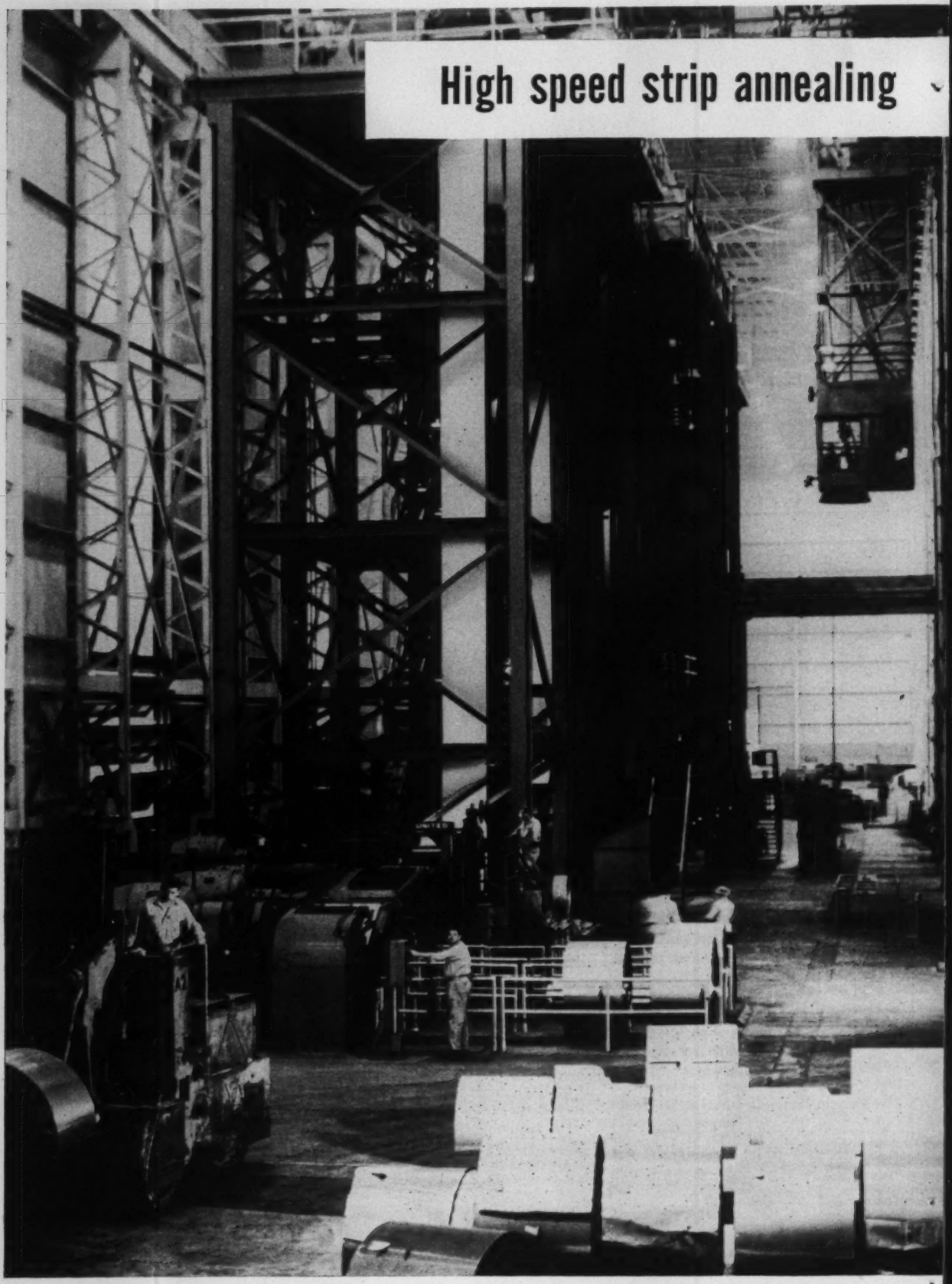
The challenge is a serious one because to a large extent the outcome of Round 2 will determine the state of prosperity in the U. S. next year.

The industry contributes to the livelihood of 1 out of every 7 U. S. workers and 1 out of every 6 business firms, including some 25,000 suppliers of materials and parts.

Irwin H. Such

EDITOR-IN-CHIEF

High speed strip annealing



gives steel makers major cost and product benefits

Evolution of process gets major assist from Reliance's creative engineering

Speeds up to 2,000 feet per minute, thinner gauge steel, greater annealing uniformity, and higher tonnage output are the chief reasons for the spread of this process. Actually, lines like this one at Kaiser Steel can handle gauges from .0150" down to .0070" in coils up to 90" outside diameter and widths of 42" or greater . . . reducing costs in a growing tinplate industry.

Associated electrical equipment must be upgraded to meet the call for higher yield annealing lines. Reliance engineering is presently meeting that challenge. Here are some of the ways:

Furnace tension control

On advanced Reliance systems, the exit bridle is the lead and overall furnace tension is maintained by the entry bridle. Maximum line flexibility is provided, since the entry bridle can be position-controlled or tension-controlled. In tension-control, a regulator monitors the bridle torque, maintaining it at the pre-set level.

For position-control, a torque-regulated furnace tension unit position-controls the entry bridle. The tension unit consists of a short loop provided by a loaded roll, the position of which modifies the speed of the entry bridle. The roll may be locked in position when the bridle is directly controlling strip tension.

Helper drive torque regulation

Since it is economically unfeasible to regulate each of many furnace helper motors, the helpers have been grouped by furnace function (heat section, hold section, slow cool and fast cool). Each group is torque-regulated and each motor held within a group can be adjusted manually to take its share of the load while the entire section automatically holds its relative load position with respect to other sections. Reliance has encouraged the use of this system.

Reliance also strongly recommends the equipment explained below:

Strip-tension measuring load cells

These measure the strip tension existing at the exit end of each furnace section. Associated recording meters enable the operators to relate strip quality and elongation to helper drive torque settings of each section for different conditions of speed, gauge, etc.; in other words, able to study various settings of torque—and be able to repeat those which give the best results.

Automatic furnace tension control

The load cells provide an output signal which *can* be used as an input to the section torque regulators to maintain continuously desired tension. Correct inertia compensation for line speed changes is inherently provided by this system.

Synchro-control of looping tower

This eliminates inaccessible or hard-to-service photo-electric elements. A synchro is used to indicate and regulate tower position.

Automated strip feed-up

This increases the efficiency of entry end material handling, allowing high furnace speeds to be maintained.

It will pay you to discuss with Reliance engineers some of the fine points of annealing line system controls and drives. Creative application engineering, plus the ability to assume total responsibility through start-up and service are the reasons why Reliance is so readily acceptable at engineering, production and management levels of industry. Call your Reliance Sales Engineer. He has an office near you. If you prefer, write for Bulletin L-2513.

L-1673-BW

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At Acme Steel Company—a single Cleveland Worm Gear Drive powers this rugged blooming mill manipulator

Here's a single, rugged Cleveland Worm Gear Drive that supplies dependable trouble-free power transmission for peak performance of the manipulator on Acme Steel Company's new blooming mill at Riverdale, Illinois.

A total of over 200 Clevelands daily work 'round-the-clock transmitting power to various important equipment installations at Acme Steel Company.

Throughout industry, Cleveland Worm Gear Drives and Speed Reducers are used on all kinds of tough jobs, wherever dependable power transmission is vital. Compact and space-saving, Clevelands have high shock load resistance. Their case-hardened steel worms and long wearing nickel-bronze gears actually improve with use. Even operating under continued, severe overloads, danger of sudden failure is remote.

Write today for new Bulletin 145 showing the wide size range of Speed Reducers in the Cleveland line—or better yet, contact your nearest Cleveland Representative.

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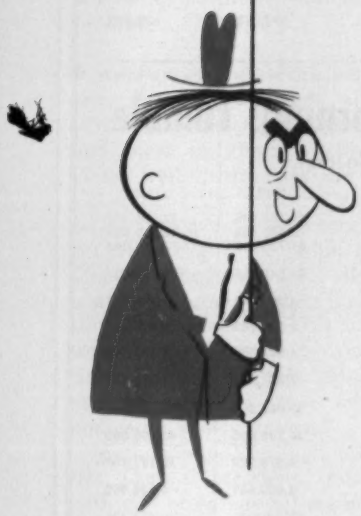
Drives

Cleveland Worm & Gear Division
Eaton Manufacturing Company
3270 East 80th Street • Cleveland 4, Ohio

EATON ®

METALWORKERS

Split Vote on Profits Outlook



X Bullish	X Bearish
• Better Inventory Balance	• Foreign Competition
• Expected Sales Upturn	• Price Warring
• More Capital Spending	• Cost Increases
• New Products	• Lower Profit Margins
• Government Spending	• High Taxes

METALWORKERS ARE as wary as politicians in their forecasts of profit prospects for the second half.

They can pinpoint factors in the economy that augur for a good final quarter. But they also see some minus factors that make the outlook fuzzy.

Here are the plus factors for an upturn in profits—and for most metalworkers it won't be felt before early September:

• Inventory paring has about run its course. The situation should stimulate a higher purchasing rate to keep pace with production needs.

• The consumer should be starting his seasonal buying upturn, which should add altitude to the sales curve.

• Company earning reports (see next page) are generously sprinkled with plans for equipment buying in the second half.

• Government spending will continue at a high level.

Here are the forces that tend to keep the pressure on profits:

• Price competition remains severe.

• The cost of doing business, particularly labor and services, is going up in most firms.

• The impact of foreign competition in both domestic and overseas markets continues to be reflected in earning statements.

Those comments and observations were gleaned from the first half reports of leading metalworkers.

Steelmakers are looking for "month - to - month" improvement, starting late this month. As an industry, steel suffered the sharpest decline in profits. The blow came in the second quarter when operating rates plunged. Harleston R. Wood, president of Alan Wood Steel Co., also blamed increased employment costs for the substantial drop in profits. He added: "It's only a question of time before steel production will begin to reflect current consumption."

Bethlehem Steel Co., whose operating rate averaged 55 per cent of capacity in July, reports that new orders coming in indicate an operating rate of 60 per cent for the third quarter and 70 per cent in the fourth.

Steel industry profits also reflect a substantial capital improvement program—estimated at $1.7 billion for 1960. There have been few, if any, major cuts in over-all programs.

• **Impact of Foreign Sales** — Ma-

Metalworking's 1st Half Earnings Show Pinch

Net Income

SELECTED COMPANIES	1960	1959
Aerojet-General Corp.	$4,456,556	$3,832,661
Aeroquip Corp.	(1)2,169,842	(1)2,001,822
Air Reduction Co. Inc.	7,962,198	7,817,122
Allis-Chalmers Mfg. Co.	7,780,145	5,314,739
Aluminum Co. of America	21,726,308	28,936,333
American Brake Shoe Co.	3,138,068	5,009,800
American Can Co.	17,342,559	21,489,543
American Machine & Foundry Co.	10,560,000	8,506,000
American Steel Foundries	(1)5,917,947	(1)4,953,049
Bliss (E. W.) Co.	938,864	629,784
Bliss & Laughlin Inc.	1,440,990	1,719,229
Budd Co.	6,479,000	8,976,000
Buffalo Forge Co.	312,369	247,719
Caterpillar Tractor Co.	20,378,447	28,863,689
Chance Vought Aircraft Inc.	1,535,396	3,087,786
Clark Equipment Co.	4,009,989	6,732,702
Cleveland-Cliffs Iron Co.	5,097,427	4,739,504
Continental Can Co. Inc.	13,191,000	19,267,000
Cooper-Bessemer Corp.	2,300,255	2,264,560
Cutler-Hammer Inc.	2,960,040	3,521,247
Electric Autolite Co.	4,521,266	5,150,288
Electrolux Corp.	1,897,046	1,457,023
Ferro Corp.	1,729,000	1,789,000
Ford Motor Co.	264,800,000	285,900,000
General Bronze Corp.	252,333	531,105
General Electric Co.	111,429,000	117,239,000
General Motors Corp.	612,000,000	590,000,000
General Steel Castings Corp.	781,604	1,138,471
Hanna (M. A.) Co.	6,437,017	6,082,857
Harbison-Walker Refractories Co.	6,323,365	5,556,198
Hupp Corp.	1,045,000	1,027,000
IBM Corp.	76,616,285	64,030,809
International Resistance Co.	1,045,972	927,601
Johns-Manville Corp.	13,510,000	14,920,000
Kaiser Aluminum & Chemical Corp.	11,737,000	13,222,000
Kawneer Co.	481,897	679,180
Kennecott Copper Corp.	42,660,746	47,760,040
Maytag Co.	5,652,661	6,657,435
Minneapolis-Honeywell Regulator Co.	11,984,266	12,285,696
Monarch Machine Tool Co.	155,666	138,663
National Acme Co.	838,766	804,899
National Lead Co.	25,296,609	26,811,790
National Malleable & Steel Castings Co.	1,301,646	1,848,618
National Research Corp.	99,290	(a)100,534
New York Air Brake Co.	820,167	1,168,484
North American Aviation Inc.	(1)16,526,000	(1)21,941,000
Porter (H. K.) Company Inc.	2,038,655	4,058,249
Radio Corp. of America	18,100,000	19,400,000
Reynolds Metals Co.	13,218,000	20,609,000
Robertshaw-Fulton Controls Co.	1,737,672	3,085,114
Rockwell-Standard Corp.	8,355,718	10,553,837
St. Joseph Lead Co.	2,504,963	3,626,343
Signode Steel Strapping Co.	2,479,000	2,625,515
Simonds Saw & Steel Co.	2,092,710	2,815,353
Square D Co.	5,356,000	3,862,819
Standard Forgings Corp.	363,209	446,247
Stewart-Warner Corp.	3,461,149	3,769,864
Studebaker-Packard Corp.	3,359,585	12,073,281
Thompson Ramo Wooldridge Inc.	5,033,861	4,926,209
Towmotor Corp.	1,629,876	1,149,067
Union Carbide Corp.	81,191,880	90,442,617
United Engineering & Foundry Co.	2,432,594	3,270,306
Westinghouse Electric Corp.	40,454,000	34,150,000
White Motor Co.	5,232,187	6,793,005
Woodward Iron Co.	2,577,338	2,911,938
Youngstown Steel Door Co.	695,052	633,990

Steelmaker Earnings Tumble

Net Income

SELECTED COMPANIES	1960	1959
Alan Wood Steel Co.	$1,205,145	$2,096,321
Allegheny Ludlum Steel Corp.	5,532,584	12,369,009
Armco Steel Corp.	41,733,219	50,593,068
Bethlehem Steel Corp.	81,543,035	123,158,829
Continental Steel Corp.	2,308,642	2,788,457
Copperweld Steel Co.	2,253,518	3,497,798
Crucible Steel Co. of America	3,034,143	8,621,061
Detroit Steel Corp.	4,207,465	5,793,035
Granite City Steel Co.	7,637,551	8,370,326
Inland Steel Co.	33,067,503	42,172,381
Jones & Laughlin Steel Corp.	26,136,000	42,206,000
Kaiser Steel Corp.	6,874,924	10,197,707
Lone Star Steel Co.	3,608,631	6,338,902
National Steel Corp.	27,301,361	39,461,108
Phoenix Steel Corp.	(a)159,000	490,000
Pittsburgh Steel Co.	2,405,194	4,041,518
Republic Steel Corp.	41,408,483	67,089,717
Sharon Steel Corp.	2,306,841	3,070,905
U. S. Steel Corp.	193,472,241	254,948,496
Washington Steel Corp.	(1)1,790,500	(1)1,980,470
Wheeling Steel Corp.	8,156,000	11,011,000
Youngstown Sheet & Tube Co.	18,889,010	28,704,805

(a) Net loss. (1) For nine months.

chine tool builders are doing generally better than they did last year saleswise, but much of the strength can be attributed to foreign sales. In metal cutting tools, for example, new orders in the first six months totaled $71.1 million vs. $66.7 million in all of 1959. In forming equipment, foreign orders hit $17.6 million in the first half vs. $24 million in all of 1959.

Jerome A. Raterman, chairman of Monarch Machine Tool Co., comments: "At the current level of U. S. manufacturing activity, it is certain that machine tools are wearing out much faster than they are being replaced. The obsolescence of U. S. plants is increasing because of slow spending for tools."

Large capital outlays in several industries are brightening the outlook for big equipment builders and construction contractors. Arthur G. McKee & Co. reports its backlogs at midyear were $66 million compared with $43 million at the end of 1959. "Much of the work on the books," officials point out, "will not yield its full profit potential this year."

• Farm Construction Equipment

—Allis-Chalmers Mfg. Co. reports its sales of farm machinery and construction equipment trailed expectations in the first half. R. S. Stevenson, president, adds: "Deliveries of both in the last few weeks have shown a slightly better tone."

He reports Allis-Chalmers' shipments of fork lift trucks and industrial apparatus were strong in the first period.

Gardner-Denver Co., which set a sales record in the first half—17 per cent ahead of 1959's—reports its greatest increases in recent months have come from pneumatic tools, wire-wrap machines, and air compressors.

• **Appliances Lag**—Principal appliance makers note that although personal income is at a record high and most consumer products are doing well, their sales are down. Concern by the industry is reflected in comments by General Electric Co.'s chairman, Ralph J. Cordiner: "Consumers are allocating a smaller portion of their higher income to appliances. This situation can best be changed by our continuing efforts to make values and services constantly more attractive and more widely known."

Mark Cresap, Westinghouse Electric Corp.'s president, said that with one exception, all segments of his firm contributed to a 9 per cent increase in new orders (vs. first half, 1959).

The exception: Major appliances, which declined.

• **Looking Overseas** — Comments one industrialist: The aggressiveness of U. S. firms can be gaged by overseas activities. Many firms, such as American Brake Shoe Co., reported that foreign ventures increased costs and depressed profits in the first six months.

The payoff from those expenditures will show up in forthcoming profit and loss statements. A few firms are already setting the examples—Clevite Corp. in chalking up record earnings and sales in the first half cites: "Foreign business was highlighted by record volume and profit from our German semiconductor operations. Overseas replacement part business has improved; licensing income holds steady."

Navy Leans on Industry Knowhow in Weapons Race

THE NAVY'S SHOPPERS put missiles, atomic subs, and research high on their 1961 lists, Vice Adm. George C. Beardsley, chief of Naval material, told Cleveland industrialists last week.

These projects will play a major role in fund allocations, he said:

• Newer types of submarines will be smaller, more powerful, and will operate at depths of several thousand feet. High priority: Find a way to make a practical titanium submarine.

• Fighter subs which will be used in antisubmarine warfare. Immense power from more efficient reactors will increase maneuverability. Wanted: Lighter, more efficient shielding metals.

• More specialized missiles which can be launched from submerged subs against aircraft and surface vessels. Needed: More new ideas, research.

• Exotic hydrofoil warships which will be built with aircraft materials. Jet or atomic powered, they will travel more than 100 miles an hour. Probable construction metals: Aluminum hulls, superstructure; stainless, high tensile steel, or titanium hydrofoils. Full size vessels are already on the drawing boards.

• **Who Has the Knowhow?**—Part of the procurement problem is that the Navy's brass only knows what it wants in terms of performance. Advanced materials, machinery, fabrication techniques are almost wholly in the hands of industry, explained Admiral Beardsley.

Titanium subs are an example. It is an ideal metal for underwater use—light, corrosion resistant, strong. Welding is a problem because it must be done with shielding gases that are highly difficult or impractical to handle at an outdoor shipyard.

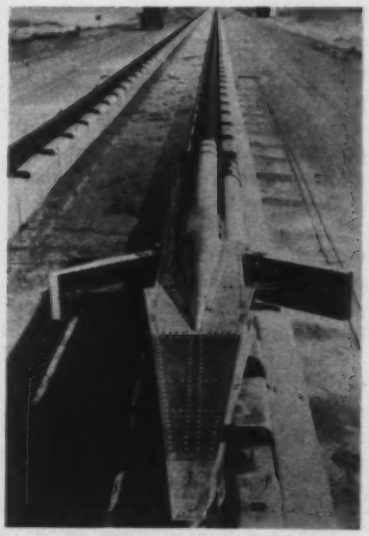
• **Obsolete**—Guns, smokestacks, and radar bedsprings are on the way out.

Emphasis on missiles has brought about the complete switch to missile ships. Conventional cannons are already museum pieces.

Nuclear power will continue to get a major share of attention, Admiral Beardsley stated. Other power sources coming in for more attention include the direct conversion devices — thermionic and thermoelectric.

A 20 ft air cushion machine has just been tested on the Potomac, said Admiral Beardsley. A downward blast of air is sealed by a curtain of water to support the craft just above the water (the Navy calls it a sea skimmer). Possibility: High speed water transports.

• **Continuing Operation** — The admiral's meeting with Cleveland industrialists was part of a continuing program called Operation Knowhow. Its purpose: To get faster, improved solutions to the Navy's problems by acquainting industry fully regarding its needs.



FAST STOPPER: Braking fins bring a steel and aluminum, rocket propelled sled to a safe stop from 2688 mph at Holloman Air Force Base, N. Mex. The 16 ft long monorail vehicle was built by Northrop Corp.'s Norair Div. at Hawthorne, Calif.

Faced with a 5 per cent downturn in sales . . .

Magnesium Launches Triple Attack

- ***Long an industry with one producer . . .***

  It has activated a second primary supplier

- ***Long dependent on government business . . .***

  It is reappraising the civilian market

- ***Long beset with processing problems . . .***

  It is establishing facilities for customer orientation

THE MAGNESIUM industry is hustling to boost demand for its product.

It now has a second primary supply source; it is emphasizing customer service; it is fighting to broaden its share of the civilian market.

• With the increase in primary supply, the industry must lift sagging sales and open new markets for the additional output.

Until last year, Dow Chemical Co., Midland, Mich., was the sole source of primary magnesium for civilian applications. Reducing its metal electrolytically from sea water, the company has a capacity of 83,000 tons a year.

A second primary supplier, Alabama Metallurgical Corp., Selma, Ala., started operations in 1959. The plant made its first magnesium shipment last December. Jointly owned by Calumet & Hecla Inc., Chicago, and Brooks & Perkins Inc., Detroit, it employs the Pidgeon process to refine magnesium from dolomite. Capacity: 7000 tons annually.

(A third firm, New England Lime Co., Canaan, Conn., with 5000 tons capacity, produces magnesium ingots exclusively for the Atomic Energy Commission.)

At present, capacity is considerably in excess of consumption. In 1959, 41,000 tons of primary magnesium plus 10,000 tons of scrap and secondary magnesium were consumed.

Dow expects 1960 primary sales to be down about 5 per cent and its product division sales off 10 per cent compared with 1959.

Forecasts by other fabricators and foundries run from 10 per cent below to 25 per cent above 1959's sales.

• The use of magnesium lags research and development. Customer service is to be emphasized in an attempt to bring supply and demand into balance.

The industry has pushed research and development intensively. Some firms are working to develop magnesium for high temperature applications in jet engines and missiles; others are searching for improved processing techniques (welding, bonding, extruding), and a number are working to lower its cost. But the most urgent challenge is to make its use general.

Dow is setting up a service laboratory to help prospective users of magnesium diecastings. Customers will be invited to send engineering and production personnel to the laboratory for training.

"This laboratory will be used," says Dr. Leland I. Doan, president of Dow, "to find how you can produce a casting in magnesium more economically than with other metals, how you can cycle a diecasting machine to produce magnesium parts more rapidly, how you can gain the advantage of magnesium in new uses."

• Detroit is seen as the area of greatest promise.

Autodom is being ardently courted. It is regarded as a potential tonnage market for such applications as: Diecastings for transmission and clutch housings, convertible top mechanisms, engine fans, fuel pump parts, bezels; sheets, plates, extrusions, and forgings for truck and trailer bodies; magnesium sand castings for wheels.

The industry is quick to cite that foreign carmakers use magnesium liberally. Example: The Volkswagen plant in Germany, says Brooks & Perkins, is using 90 tons of magnesium castings per day.

• Diecasting could well provide the breakthrough for a flood of consumer applications.

Magnesium lends itself to diecasting because of its inherent lower heat content. The invention of an automatic metering mechanism for supplying molten magnesium to cold chamber machines has given the process a needed boost.

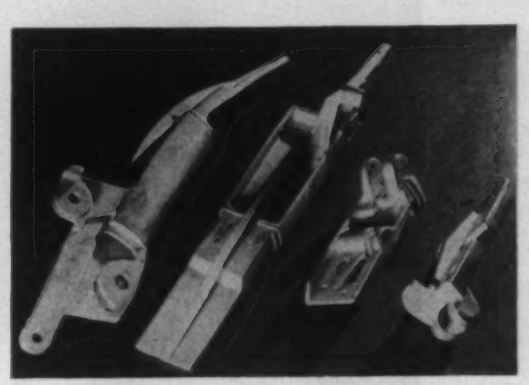
Bureau of the Census figures show that diecasting shipments in April were 322 tons vs. 212 tons in April, 1959. Diecastings include vacuum cleaner parts, portable saw parts, camera housings.

• At present, defense work is looked upon as the bread and butter of the industry.

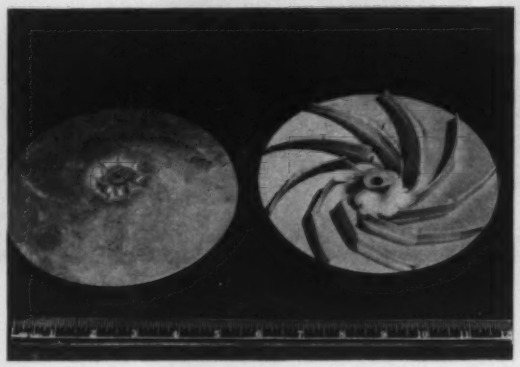
Most of the ingots shipped to foundries by American Smelting & Refining Co., New York, go into electronic housings, landing wheels, brake rings, and other components related to the aircraft, missile, and electronic industries.

Twenty-five per cent of Dow's primary production is directed toward defense and about 75 per cent

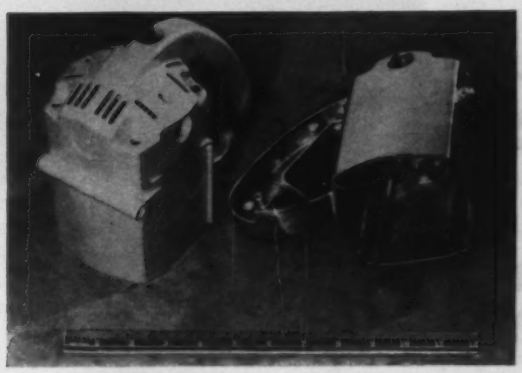
Lightweight body of magnesium for delivery truck



Convertible fold-top mechanism parts



Vacuum cleaner parts



Portable saw parts

of its fabricated products business is military. Hills-McCanna Co., Chicago, and Bendix Corp., Teterboro, N. J., rely on defense work for 95 per cent of their business. For Brooks & Perkins, Garfield Alloys Inc., Cleveland, and Light Metals Inc., Indianapolis, it accounts for more than 50 per cent.

A few, like Modern Light Metals, Coloma, Mich., sell to both civilian and military customers but do not feel that defense is an important segment of their operations. The emphasis is toward civilian business.

• Aluminum, magnesium's biggest competitor, is also one of its best customers.

Of the 15,000 tons used for alloying other metals, a major part went to the aluminum industry. Other customers: Aircraft, electronics, missiles (skin panels and supports), luggage, graphic arts (printing plates), material handling equipment (ramps, scaffolds, pushcarts), tool and die shops (jigs and fixtures), and ships (anodes attached to hulls to combat corrosion).

• Most people in the industry feel there will be no price increase.

Almost to a company, the consensus is no price increase. Two exceptions: Garfield Alloys expects a decrease of about 5 to 7 per cent. Magnode Inc., Trenton, Ohio, feels that rising labor costs may tend to lift prices, particularly if the market for competing materials becomes firmer.

Imports are not a threat. There is a 50 per cent ad valorem duty on imported magnesium.

Some U. S. firms are buying magnesium in Canada. Europe can be discounted because its supply is short. And there is no evidence that Japanese magnesium is coming in.

華昌

WAH CHANG

World Trader Goes to Top in Refractory

IN MODEST OFFICES in New York City's Woolworth Building, a company owned, operated, and managed by Chinese-Americans—Wah Chang Corp. — is quietly making metallurgical history.

Without hoopla, and often shunning publicity, Wah Chang Corp. —until World War II an import-export house—has become the world's biggest producer of refractory metals.

• Translated into English, Wah Chang means "great development." And Wah Chang's role in refractory metals has been just that.

In two decades, it has developed this record in refractory metals:

• Hafnium—produces all U. S. requirements.

• Columbium—turns out 95 per cent of domestic needs.

• Tungsten—has 25 per cent of the U. S. market.

• Tantalum—supplies 20 per cent of domestic demand.

• Zirconium—accounts for 20 per cent of U. S. output.

• Molybdenum—produces 15 per cent of domestic needs.

The company also owns and operates the only tin smelter in the U. S. Its Texas City, Tex., plant annually produces enough tin to take care of 10 per cent of Free World consumption and 15 per cent of U. S. consumption.

• The transition of Wah Chang from a trading company to the leader in refractory metals was the direct result of World War II.

Founded in 1916, the company imported various commodities from the Orient, including tungsten ore. As war clouds darkened in the late thirties, K. C. Li, founder and president, shifted his supply source for tungsten ore from China to Brazil, Argentina, Bolivia, and Australia.

Because much of the new ore was of low quality, Wah Chang built a treating plant to upgrade it. That led the company into the manufacture of tungsten chemicals during the war years, then into tungsten metal in the late forties, and finally into tungsten mill products in the early fifties.

• Wah Chang's full blown entry

Wah Chang's K. C. Li Jr. forecasts: "With stepped-up base alloy research bringing rapid improvement in workability, castability, and usability, designers will more and more turn to refractory metals. There won't be a design for a missile, rocket, or nuclear reactor that won't specify these metals. They've come of age!"

Metal Field

into the refractory metal field came as the aftermath of a setback when it tackled titanium.

In the early 1950s, enraptured by the fabulous future being touted for titanium, the company set up a pilot plant operation for that metal. The romance was short-lived! As the market for titanium dropped, so did Wah Chang's interest in it.

But the experience Wah Chang got from its brief flirtation with that metal set off a chain reaction that put it into production of five other refractory metals figuratively overnight. The sequence came like this:

Because of the similarity in extraction processes, a natural move was to zirconium production (in 1956) and the hefty Atomic Energy Commission contracts that went with it. From zirconium ores came hafnium—Wah Chang's first one-two punch. The next step was to columbium-tantalum (which occur together in ore bodies) where the extraction process is similar to that for zirconium-hafnium. The entry into molybdenum came about primarily because it is processed similarly to tungsten.

• "Today Wah Chang is the only fully integrated company in the refractory metal field," says K. C. Li Jr., vice president of operation and sales.

The complex includes:

- Four tungsten mines in Brazil; two in the U. S. (The U. S. mines aren't operating now because of higher mining costs here.)
- The world's largest columbium mine in Brazil (with reserves of 15 billion lb) which begins operation this month.
- A columbium concentrates plant under construction in Brazil. It's owned jointly with Molybdenum Corp. of America.
- A smelter at Texas City, Tex., with the capacity to produce 40,000 to 50,000 tons a year of metallic tin plus large quantities of ferrocolumbium and ferromolybdenum.
- At Glen Cove, N. Y., an ore-to-metal tungsten plant (with a capacity of 3 million lb a year), molybdenum production facilities, a limited amount of columbium-tantalum production.
- A new plant at Fair Lawn, N. J. (that will combine operations of two older plants) to produce wire and rods from the six metals.
- At Albany, Oreg., a zirconium (1 million lb a year), hafnium, columbium (240,000 lb a year), tantalum (120,000 lb a year), processing plant. The facility also produces sheets, welded shapes, tubing, rods, and bars (of all these metals).

Wah Chang has seen its burgeoning empire lift sales from $5 million in 1940, to $15 million in 1950, to $27 million last year. Forecast for 1965: $35 million.

• "Refractory metals have come of age," says K. C. Li Jr. "There's not a missile, jet engine, or nuclear reactor designer today that doesn't have to think in terms of the refractory group. This wasn't true five years ago."

Of all the refractory metals, columbium has the greatest potential, believes Mr. Li. Reason: "Its weldability, workability, and availability." He points out product mix is being hiked by developments such as being able to cast ingots up to 16 in. in diameter and weighing 3000 lb.

Because columbium can withstand temperatures up to 1700° F before corrosion sets in, Wah Chang expects the metal's uses to grow in such atomic energy applications as fuel and control elements and reactor core elements. Potentials look equally bright in missiles and rockets, believes Mr. Li.

Columbium's major use continues to be in ferrocolumbium alloys for the steel industry. Wah Chang believes greater use of these alloys would be a positive step toward improved steelmaking processes, but is meeting some sales resistance on that point. Nevertheless, Wah Chang plans to stress ferrocolumbium (and ferromolybdenum) production at its Texas City smelter, and hold tin production there to 2000 to 3000 tons a month.

• Wah Chang's market program in the other refractory metals is mainly geared to expansion of existing uses.

It will push: Tungsten in nucleonics and electronics plus some stepped up missile-rocket usage in skins and nozzles; tantalum for electronics, metalworking cutting tools, surgical equipment, and some chemical processing equipment; zirconium and hafnium for atomic energy uses; molybdenum for steelmaking and glassmaking, electronics, missile and aircraft components.

• Wah Chang is making sure it doesn't loose its international flavor now that the emphasis is on metals rather than trading.

It still maintains a world-wide import-export business in scores of commodities. The company also has a division that buys and sells ores. Lastly, 50 Wah Chang engineers roam Europe, the Far East, and the Near East, in their capacity as consultants for powerplant and chemical plant construction.

Steel's Performance Rebounds...Will Nixon Push Reform On Depreciation?...Surplus Tool Sale Coming

Steel Industry Output Per Worker Manhour

(Index—1947 = 100)

1950	111.9	1957	128.9
1955	129.4	1958	126.6
1956	130.4	1959	141.8

Steelmakers set an all-time high in "productivity" last year. The increase was 12 per cent above the 1958 performance, says the Bureau of Labor Statistics. The new peak may stand for some time because the industry was rebounding from a recession and long 1959 strike.

● **REPUBLICANS OFFER HELP**—The Republican party gives high priority to economic growth in its platform. It promises "broadly based tax reforms . . . including realistic depreciation schedules"; the elimination of all featherbedding practices in "labor and business," and protection of domestic industry from injurious foreign competition. The platform calls for "effective administration of the Trade Act's escape clause and peril point provisions." Neither depreciation nor foreign competition is discussed further, but sources close to Vice President Nixon report he will try to get the Treasury Department to O.K. depreciation reform if he is elected. Treasury is reluctant to allow any tax changes which cause an immediate drop in revenue. The vice president's views on foreign competition are also thought to be a little more realistic than President Eisenhower's. He has sided with the free trade group on almost all occasions where the State Department has had an opportunity to influence his decisions.

● **SEC AND THE CHRYSLER AFFAIR**—The Chrysler affair is getting plenty of attention from the Securities & Exchange Commission. But the interest is "unofficial" because "the facts are not in yet." The SEC could act under regulation X-14, which requires a public corporation to disclose the interests of any officer in any supplier company when a material transaction exceeds $30,000 or more than 10 per cent of the buyer's sales. Similar situations have developed before, but one SEC source suggests that Chrysler may become a test case. After all the facts are in, the SEC can drop the case if it finds no need for action, or it can take any (or all) of three steps to protect Chrysler stockholders: 1. The agency and the company may agree on the need for a new statement outlining all relevant relations of company officers. 2. SEC can file a public action, forcing Chrysler to disclose such matters. 3. The agency could attempt to prosecute the company for willfully violating SEC regulations.

● **PERSHING MISSILE OUT?**—The Army's Pershing missile can travel a lot farther than its 200 mile range, which keeps it within limits established by the Defense Department to separate Air Force and Army missile projects. Plans to boost that range are afoot in Army circles and may have already been presented to the joint chiefs of staff.

However, a counterproposal has been made to transfer the missile to Air Force control, reputable sources reveal. The Air Force has also requested the integration of Polaris firing submarines into its Strategic Air Command.

The infighting suggests that the Pershing may not be needed. The Air Force contends its missiles can control any nuclear battlefield of the future.

● **MORE CENTRALIZED DEFENSE BUYING**—The Army has been designated single manager for military general supplies and a Military General Supply agency has been set up at Richmond, Va. Handtools, housekeeping items, and special field equipment are examples of procurement the Army will handle for all the services. It's described as another step in the Defense Department's unification program.

● **SURPLUS TOOLS FOR SALE**—About 6700 government machine tools, manual presses, spotwelders, riveting machines, foundry equipment, and other items will be declared surplus and sold during fiscal 1961, says the General Services Administration.

Another 6300 items will be transferred within government agencies, while almost 10,000 items will go to states through the Health, Education & Welfare Department's program for schools, health, and civil defense.

Sales will be made at 35 different points in the country, rather than the 300 sales points used before. Sales information is obtainable from Kelly Air Force Base, San Antonio, Tex.

● **CAPITOL NOTES**—The value of prime government contracts awarded to small business under the setaside program hit an all-time high of $878 million in fiscal 1960 . . . The Advanced Research Projects Agency has a new program (Project Lorraine) for the study of advanced energy conversion techniques . . . A national conference on water pollution will be held in Washington, Dec. 12-14.

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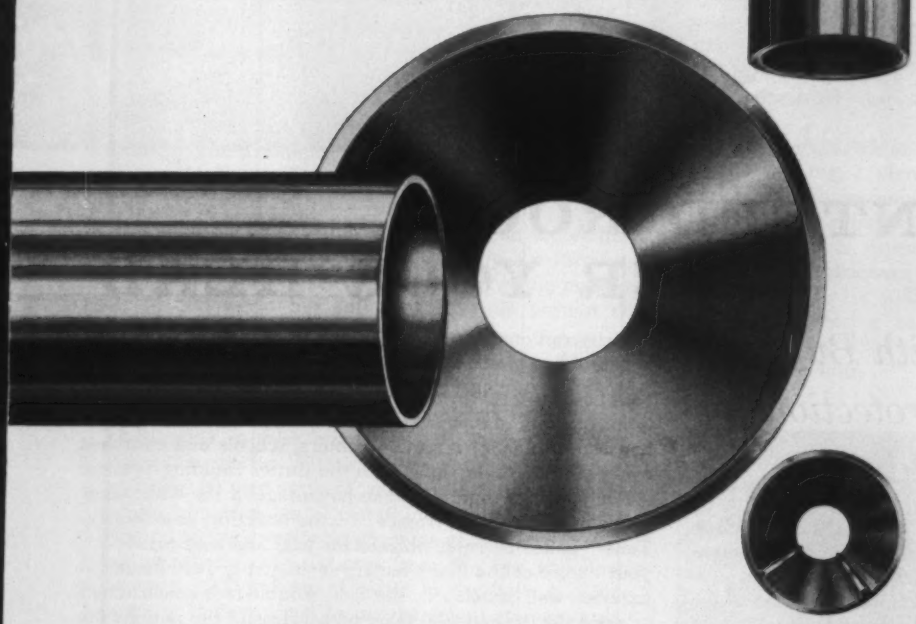

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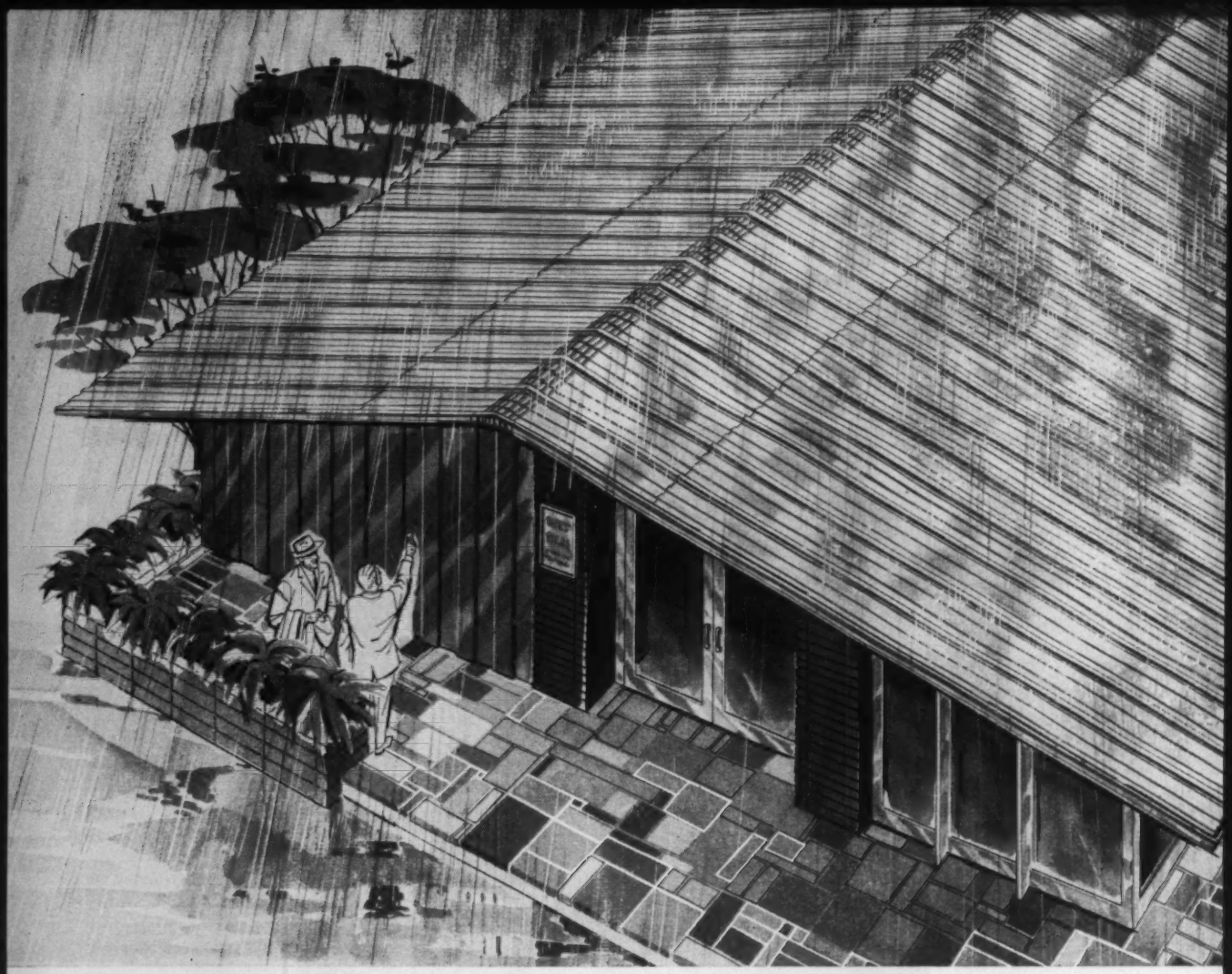

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For your new building, take advantage of the wide, clear spans of Butler rigid frames . . . the beautiful new Butler-Tone™ baked-on color finishes for wall and roof panels . . . your choice of the finest factory-insulated or field-insulated exterior wall panels . . . the fast, trouble-free construction . . . and the dependable, talented services of the nationwide group of Butler Builders.

Interested? See your Yellow Pages for the name of your Butler Builder, under "Buildings" or "Steel Buildings." Ask about financing, too . . . or write direct.

"See Sweet's Industrial Construction File—Section 8-B"

MBMA
METAL BUILDING MANUFACTURERS ASSOCIATION

BUTLER

BUTLER MANUFACTURING COMPANY

7377 East 13th Street, Kansas City 26, Missouri

Manufacturers of Metal Buildings • Plastic Panels • Equipment for Farming, Transportation, Bulk Handling, Outdoor Advertising • Contract Manufacturing

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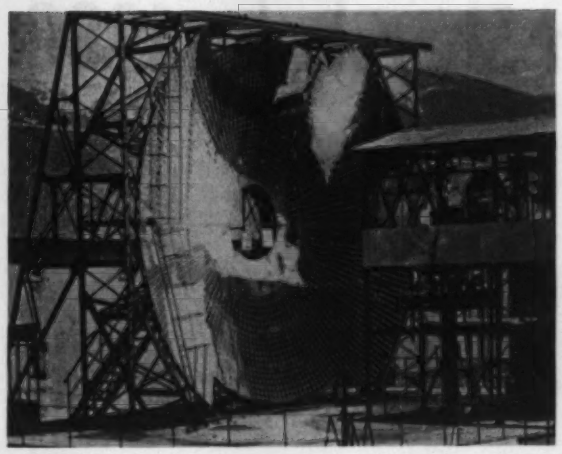


The French say this is the world's largest solar mirror

French Advance Solar Energy

PRACTICAL APPLICATIONS for solar energy in industry are close at hand, say French scientists at the National Center for Scientific Research who have operated an industrial solar furnace near Mont-Louis since 1952, turning out refractory products such as oxide bricks.

The scientists announce they have perfected a technique that answers the problem "how to store abundant 'sun calories' of summer heat for heating in the cold seasons." The technique, "if developed on an industrial scale, could bring about a considerable revolution in energy production."

The scientists have managed to store in an accumulator some of the solar energy gathered by the furnace. "It's obviously a small part of this energy at the present stage of our work, but still a worthwhile portion of it," observes a spokesman.

The researchers say, however, that mass production of heating apparatuses based on this principle is already practicable, and that the cost will be relatively low.

This spring, a solar energy heating system was put in operation at the Wilson Hotel, Perpignan, France, to provide 80 per cent of all the hot water needs. Specially treated sheets of metal, inclined at a 45 degree angle and facing directly South, were placed on the roof. They absorb the infrared rays from the sun and heat more than 1000 gallons of water to the boiling point. The water is then piped to two basement storage tanks where a 140° F temperature is maintained. Regular circuits distribute hot water under pressure throughout the hotel.

An electronic regulating device maintains the thermodynamic yield of the installation at a constant level, also automatically switching on an emergency central heating system in the event there is not enough sun to heat the water.

Asserting their leadership in the field of solar energy, the Frenchmen are constructing a second solar furnace at Odiello which is to go into operation in 1962. It will produce 550 tons of refractory products a year at half the price of the same quality products manufactured in steel plants.

S. African Steel Firm Gaining Fast

The Union of South Africa, primarily noted for its gold and diamond production, is making significant gains in building a steel industry.

The country's largest producer, South African Iron & Steel Industrial Corp. Ltd., is providing the Union with 70 per cent of its iron and steel requirements. The firm produces a variety of finished steel products, including structurals, bars, rods, rails, plates, sheets, tin plate, black plate, strip, and wire.

Within the last year, the corporation, which is partly owned by the government and locally known as Iscor, branched into the export markets, making shipments to 30 countries, including the U. S.

South Africa reports reserves of 122 million tons of high grade iron ore, 5.9 billion tons of medium grade ore, and an unlimited supply of low grade ore. Dolomite and limestone are plentiful.

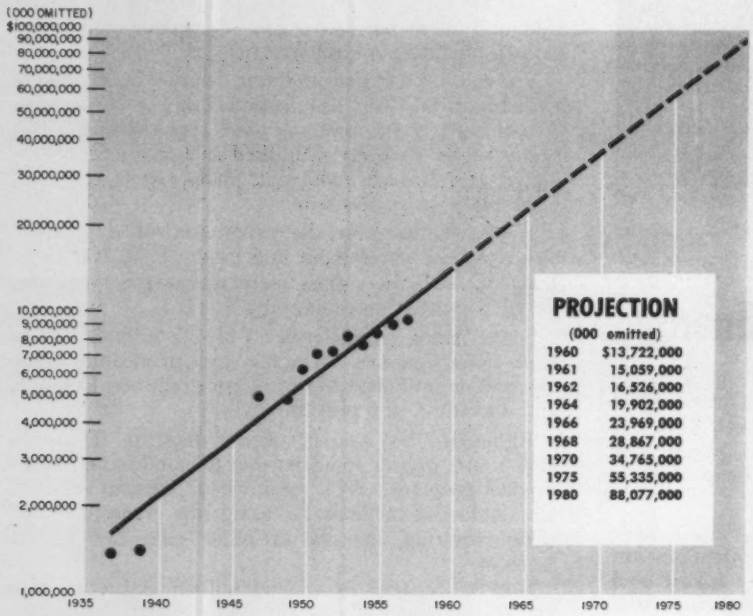
Although vast reserves of coal exist in Transvaal and Natal, only a small portion is suitable for metallurgical purposes. As a result, South African scientists are examining methods for using low grade fuels and some requiring no coke or other solid fuel in the furnace.

Iscor is engaged in a $160 million expansion plan for its two major plants (at Pretoria and Vanderbijlpark), the Thabazimbi iron mine, and the Natal colliery. Upon completion next year, the firm's crude steel capacity is expected to reach 2.35 million tons a year. Breakdown: Vanderbijlpark, 1.25 million tons; Pretoria, 1.1 million tons. The two works are presently operating at the rate of 1.8 million tons yearly and by 1965 should have an annual output of 2.6 million tons.

A 144 in. Mesta plate mill going in at Vanderbijlpark

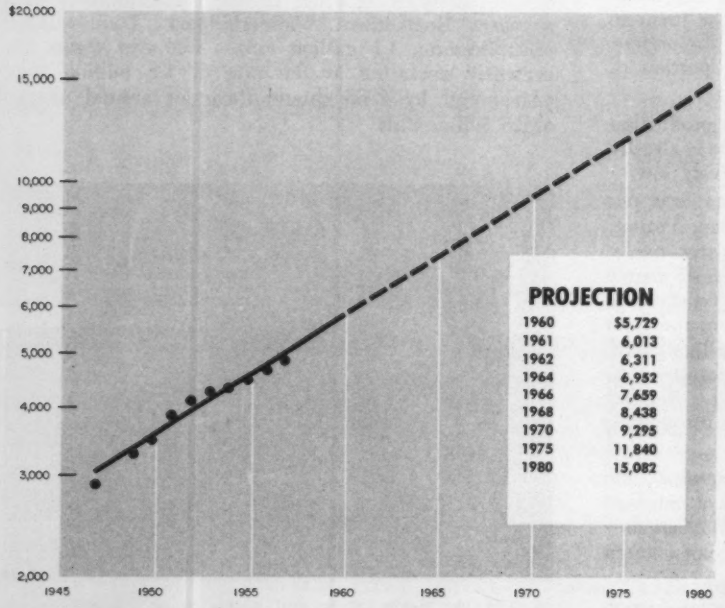
PROJECT 1980

Fabricated Metal Products To Gain Sharply by 1980



Value Added by Manufacture to Reach $88.1 Billion by 1980

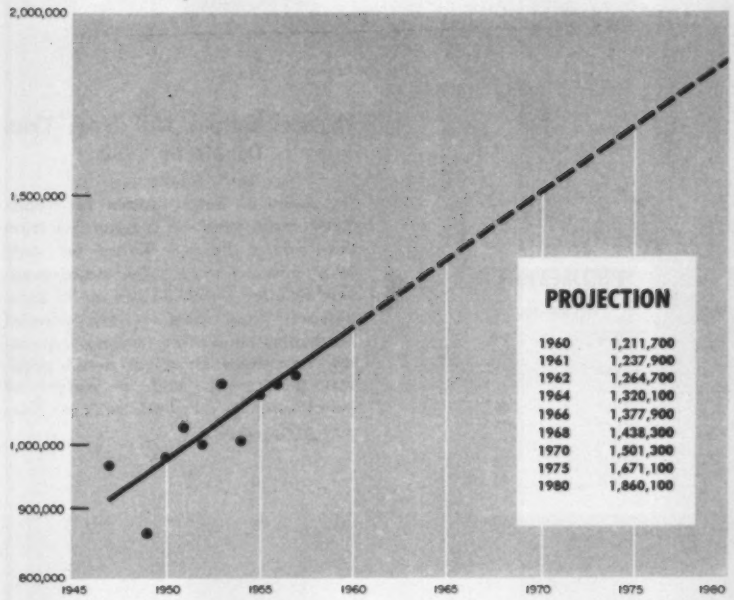
This chart shows the value added for each census year from 1937 through 1957. The dots in this and succeeding charts indicate the actual figure for each survey year. The line is the trend. Dots are missing for World War II years because surveys were discontinued then for security reasons. Dollar figures in this and other graphs are unadjusted, and the projections include estimates for inflation.



All Employees' Average Annual Earnings Will Nearly Triple

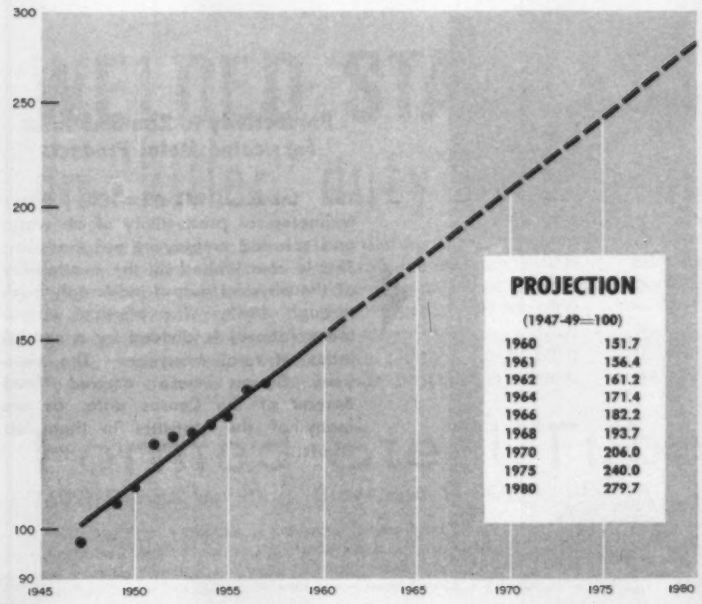
This chart is derived from corresponding census data for total wage and salary compensation and total number of employees. Economic productivity, or the yearly ratio of value added by manufacture (above) to total earnings in fabricated metal products has been nearly constant at the $1.74 average for 1947 through 1957. This illustrates the Rucker Share of Production Principle, and it shows that the employee's share of production for fabricated metal products, taken as a whole, is 57.47 per cent of the values created and that the company's share averages 42.53 per cent.

Value added by manufacture will be more than six times greater in 1980 than it is this year. Prices may rise 84 per cent. Productivity should improve by more than one-third. Those are some of the probabilities projected for Standard Industrial Classification 34 (fabricated metal products) by Eddy-Rucker-Nickels Co., Cambridge 38, Mass., a management consulting firm. This is the fifth of six metalworking growth studies prepared for STEEL.



Employment Will Jump 53.5% Within 20 Years

This charts both hourly and salaried employees for each census year from 1947 through 1957. Government figures are not available in earlier years. Although data go back only ten years, the trend for the decade is stable, and a projection for 20 years is believed warranted. Experience shows that established growth trends change slowly. But actual conditions in any future year may fluctuate above or below the trend. So all six projections represent probabilities, not precise predictions.



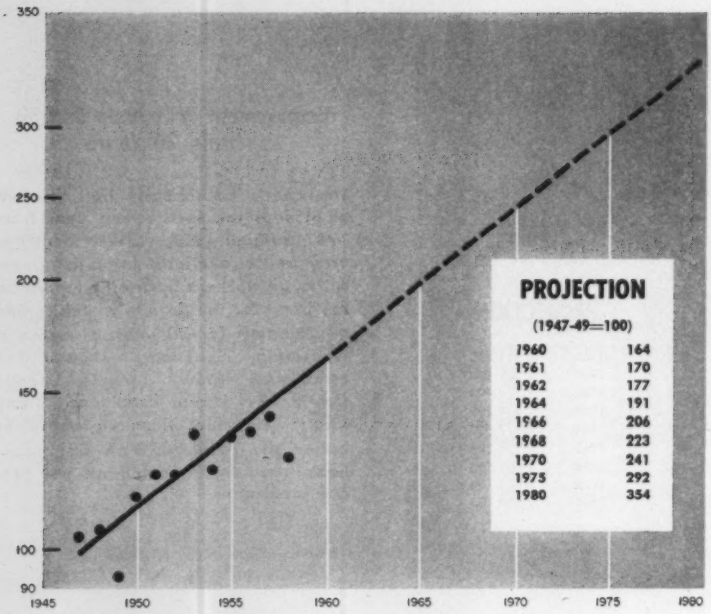
Fabricated Metal Product Prices May Rise 84.4%

This is a synthetic price index. No wholesale product price analysis for fabricated metal products is available from government sources. It's derived this way: Set up an index for value added by manufacture, using 1947-49 as the base of 100. Then divide that by the corresponding Federal Reserve Board index of industrial production for fabricated metal products. The resulting index reflects the inflation likely for SIC Group 34.

(*Please turn to Page 66*)

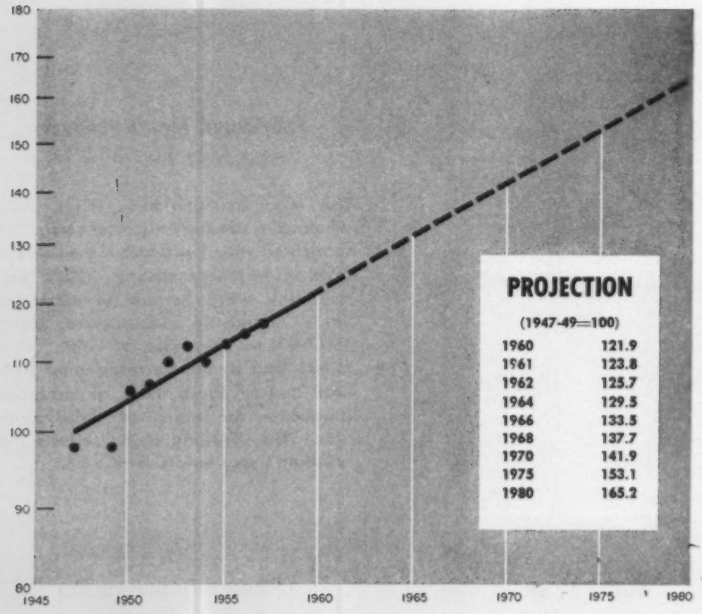
PROJECT 1980

• An extra copy of this or the first four articles in the series (STEEL, June 13, p. 122; June 27, p. 54; July 11, p. 56; and July 25, p. 84) is available. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio. The next study in STEEL's "Project 1980" will appear Aug. 29. By using material like this, you may win $1000. For details, see Pages 5 and 6.



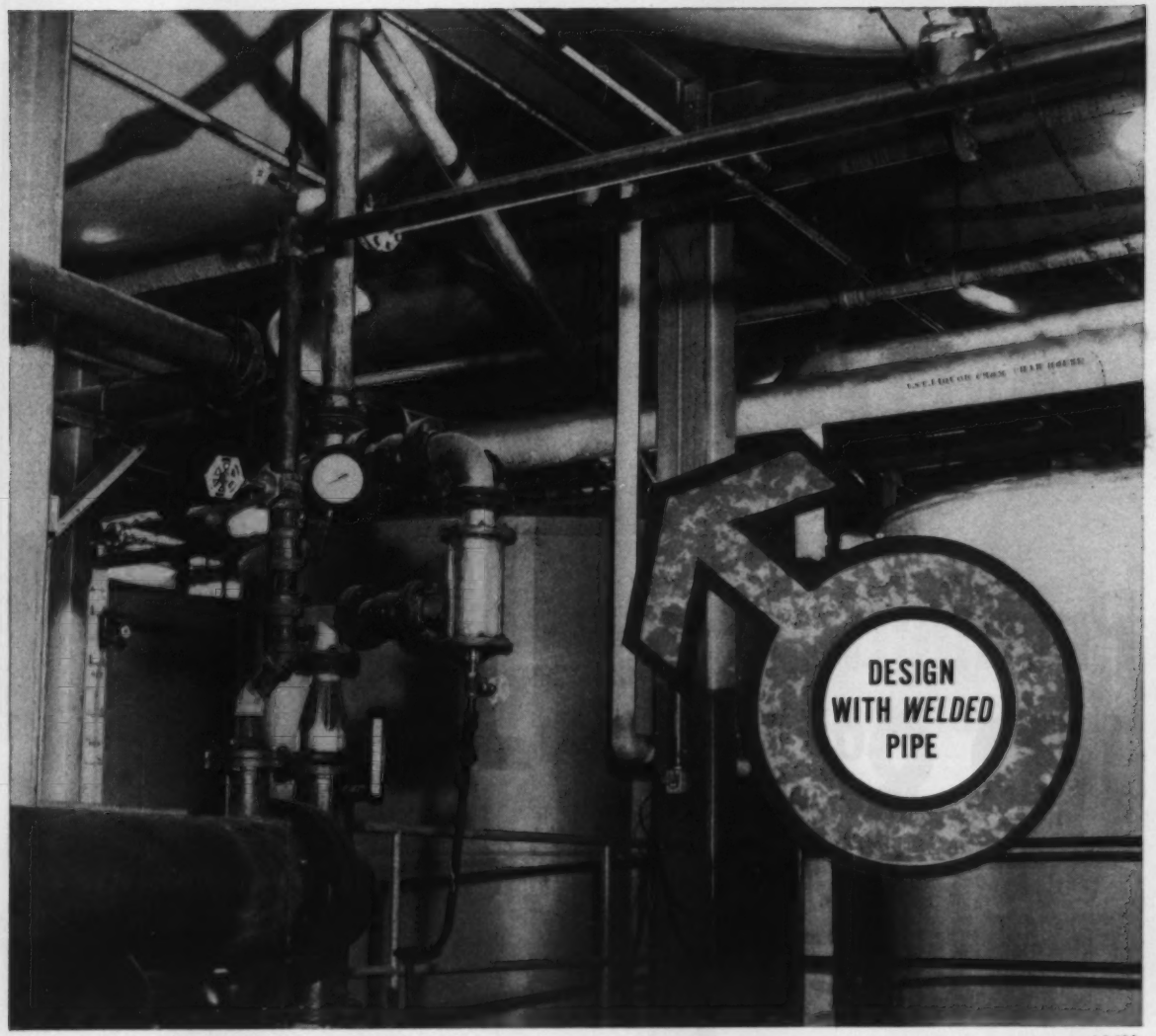
Physical Output Will More Than Double by 1980

The physical output index for fabricated metal products is available from the Federal Reserve Board for only 1947 through 1957. The major products included in SIC 34 are metal cans, tinware, hand tools, cutlery, general hardware, nonelectric heating apparatus, fabricated structural metal products, stampings, and a variety of metal and wire products not elsewhere classified.



Productivity to Rise 35.5% in Fabricated Metal Products

This index (1947-49 = 100) shows technological productivity of all wage and salaried employees per manyear. This is also limited by the availability of the physical output index only back through 1947. The physical output index (above) is divided by a special index of total manyears. The manyear figures were derived from Bureau of the Census data, as are many of the statistics in these six charts.



LC-606

WELDED STAINLESS PIPING WINS

on "killer" duty in Southern Sugar Refinery

Corrosive liquors piped over long distances in this sugar refinery service—often at temperatures of from 180°F to 220°F—played havoc with non-ferrous metal piping. Down times occurred two or three times a year for pipe replacement and costs climbed accordingly . . . until welded stainless pipe entered the picture. Now, with Type 347 stainless on the job the problem is solved. Frequent down times are eliminated, thanks to the alloy's superior corrosion resistance, and as an important bonus, freedom from product contamination is achieved. • Why not check into the profit possibilities of modern welded steel piping in your own operation? Ask for helpful Bulletin 8591—and consult a quality welded steel pipe producer in your district.

Formed Steel Tube Institute, Inc.

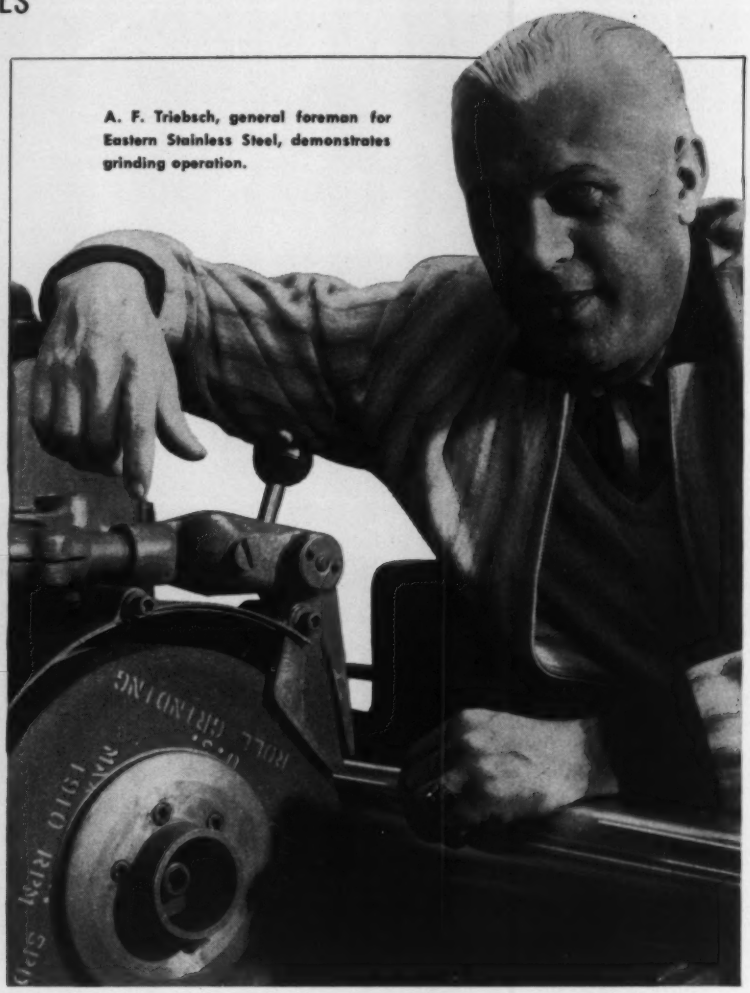
1602H Hanna Building, Cleveland 15, Ohio

• Armco Steel Corp. • The Babcock & Wilcox Co., Tubular Products Div. • The Carpenter Steel Co., Alloy Tube Div. • Clayton Mark & Co. • Damascus Tube Co. • Jones & Laughlin Steel Corp., Electricweld Tube Div. • National Tube Div., United States Steel Corp. • Ohio Seamless Tube Div. of Copperweld Steel Co. • Republic Steel Corp., Steel and Tubes Div. • Revere Copper and Brass Inc., Rome Manufacturing Company Div. • Sawhill Tubular Products, Inc. • Southeastern Metals Co. • The Standard Tube Co. • Superior Tube Co. • Trent Tube Co., Subs. Crucible Steel Co. of America • Union Steel Corp. • Van Huffel Tube Corp. • Wall Tube & Metal Products Co.

US RUBBER GRINDING WHEELS

NO CHATTER

Production UP 8%!



A. F. Triebsch, general foreman for Eastern Stainless Steel, demonstrates grinding operation.

"U.S." Grinding Wheels help EASTERN STAINLESS STEEL achieve tolerances of 2/10 of .001" in precision work

In producing stainless steel of great precision, the steel passes through a succession of work rolls under a combined force of 59,000 pounds per square inch. All the rolls must be perfectly round and the tiniest defect must be eliminated. To produce a perfectly flat mirror finish, the rolls have to be 2/10ths of .001" perfect!

This is the kind of work Eastern Stainless Steel Corporation turns out every day. To keep their rolls in perfect balance and symmetry they use "U. S." Grinding Wheels. These amazing wheels allow for no "chatter" or vibration, consequently they never groove the roll. Prior to the use of "U. S." Grinding Wheels, at least an hour a day was lost when the operator had to readjust the machine.

Using "U. S." Wheels, Eastern Stainless Steel found many collateral advantages. Maintenance was reduced by more than 20%. "U. S." Grinding Wheels outlast conventional wheels at a ratio of 4 to 1, an obvious saving of 400%.

You, too, can effect important economies and achieve greater precision by turning your grinding wheel problems over to U. S. Rubber.

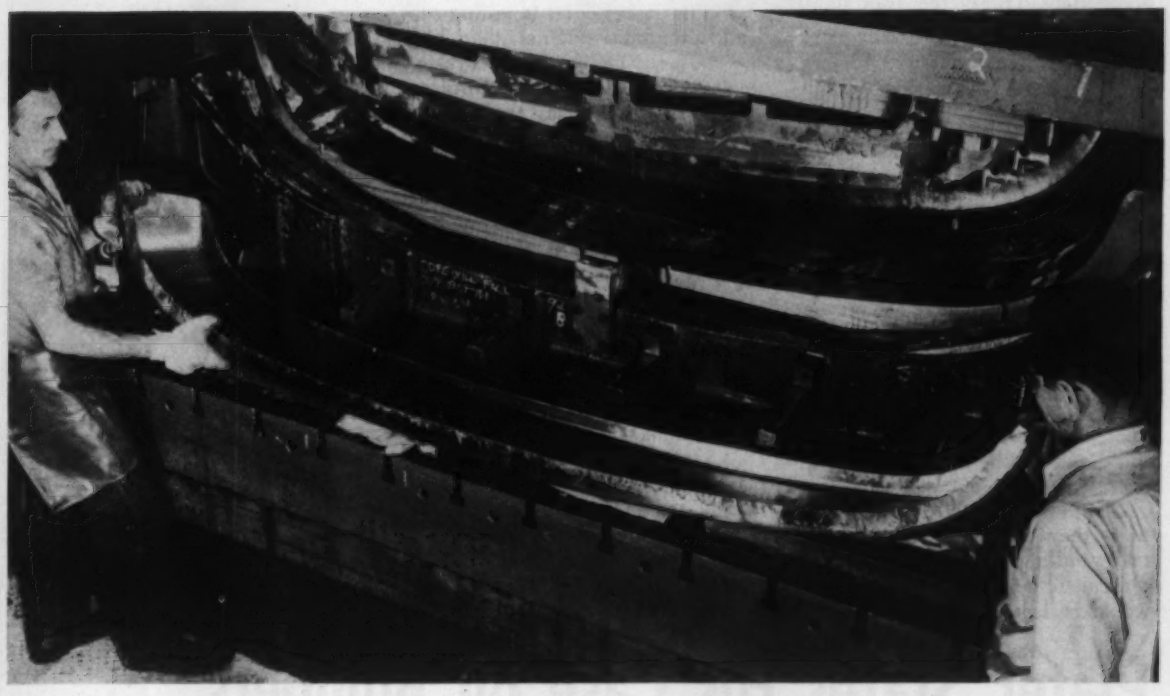
US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.



Steelmen Answer Aluminum Bumper Claims

On July 25, STEEL presented the aluminum industry's bid for automotive bumper business. This week, steelmakers and a plater present their case.

TWO SETS of factors make steel the preferred material for automobile bumpers, stress the steelmakers:

1. Steel's low cost, high strength, availability, fabricability, and proved performance.

2. Present equipment, knowhow, and experience with steel bumpers represent a tremendous investment for steelmakers, platers, and the automakers. Any switch to a competitive material that is essentially incompatible with present bumper equipment, skills, and quality control will be extremely difficult and costly.

The use of high strength, low alloy steel for bumpers is increasing. First introduced ten years ago, the material now goes into about 40 per cent of all auto bumpers.

● **Cost Claims Challenged**—Aluminum producers claimed in the July 25 issue that bumpers made from extruded aluminum would cost 50 cents to $2 less per unit. "Not so," counter the steelmen. "An auto manufacturer's investigation indicated that bumpers made with the light metal would cost $3 to $5 more than steel units."

There's also the matter of wear and tear to consider, steelmakers point out. "Although bumpers are becoming more ornamental in design, they must still be strong enough to withstand a great amount of wear and tear under a variety of driving and parking conditions.

"The relative hardness of chrome plated steel (Rockwell B 86) and of anodized aluminum (Rockwell B 75) proves the superiority of steel bumpers in resisting scratches and abrasions under typical conditions of passenger car use. And, of course, steel is inherently stronger than aluminum.

"Because steel bumpers are attached to automobiles with steel brackets, there is no chance for galvanic action to cause bumper corrosion as could be the case if bumper and brackets were made of dissimilar metals.

"As exemplified in bumpers, the blue-white, mirror-like surface of chrome plated steel is the standard by which the public judges automotive brightwork. A recent survey, made for a major steel producer, shows that the public considers chrome plated steel superior to aluminum."

Stainless Is Being Tested

Stainless clad steel, bonded either metallurgically or with resin, con-

(Material in this department is protected by copyright, and its use in any form without permission is prohibited.)

tinues to show promise for bumpers, although material costs are still high. Mack Trucks Inc. uses stainless clad bumpers for its commercial buses. At least five foreignmade automobiles use solid stainless bumpers on all or some of their models.

One firm is trying to sell stainless clad bumpers to Ford Motor Co. for the Falcon. They reportedly would be made of 0.090 gage steel with a 10 per cent single cladding of 301 stainless. The reverse side of the bumper could be coated with a noncorrosive paint. To prevent rusting at bolt holes, a plastic washer can be used with the bolts to provide a watertight seal. Corrosion along the edges could be prevented by "dragging and crushing" the stainless over the edges during trim operations.

Claims for stainless bumpers are that they eliminate plating and many buffing costs. In addition, replacement and maintenance costs would be less.

Exhaust Notes

• GM's Tech Center is testing several aluminum engines that have no sleeves. The bores are straight, high silicon aluminum. Displacement is the same as that on the forthcoming aluminum engine for the Buick-Oldsmobile-Pontiac compacts. Thinking is that GM will eventually want to drop liners for its aluminum engine family.

• Ford Motor Co. is studying a positive reaction valve system which has no backlash—therefore no hydraulic valve lifters.

• Ford Tractor & Implement Div. says it plans to boost sales in the light industrial equipment market by expanding its sales organization. How: By adding the product lines of Sherman Products Inc., a recently acquired firm, and by selling components and products to original equipment manufacturers.

U. S. Auto Output

Passenger Only

	1960	1959
January	688,731	545,756
February	659,323	478,518
March	654,242	576,080
April	582,909	578,846
May	611,226	546,817
June	613,147	557,995
July	437,700†	555,410
7 Mo. Totals	4,247,278	3,839,422
August		239,149
September		258,151
October		507,527
November		254,527
December		494,931
Total		5,593,707

Week Ended	1960	1959
July 2	125,868	108,397
July 9	89,769	123,147
July 16	105,113	127,502
July 23	112,179	124,446
July 30	107,330†	122,518
Aug. 6	95,000*	108,240

Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

Plater States His Case on Bumpers

"IN DISCUSSING plated coatings, it's important to remember that the advantages of plating apply just as much to aluminum or zinc parts as they do to steel.

In my opinion, the basic area of retarding corrosion seems to lie in the type of nickel plating and how it's applied to the material," asserts Dr. Richard B. Saltonstall, technical director, Udylite Corp., Detroit.

"Some bumper manufacturers are still using copper-nickel plate. There's no question that this plating produces an excellent mirrorlike finish after chome is applied and has better initial corrosion protection. But beyond possibly a year of active use, copper seems to speed up corrosion action.

"Based on fairly well known exposure tests, a copper-nickel coating is not equivalent in corrosion protection to an all-nickel coating.

"Bolt hole cracking is a problem that's being overcome. Plating technology has been developed to where we can produce deposits that will not crack when the steel is punched or otherwise formed.

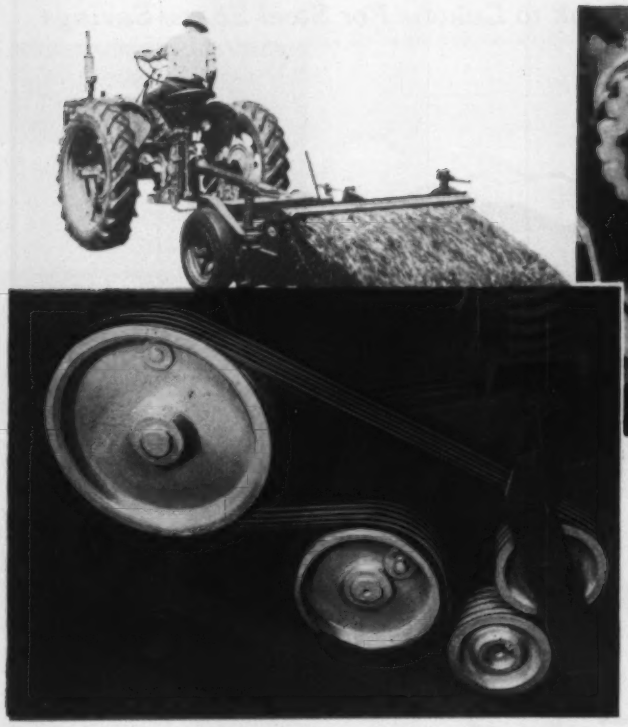
"Refinishing and replating steel bumpers is a tremendous business. I have not yet seen any feasible way to refinish and rework aluminum bumpers if they are damaged. This could be an important warranty cost area that needs a good deal more study.

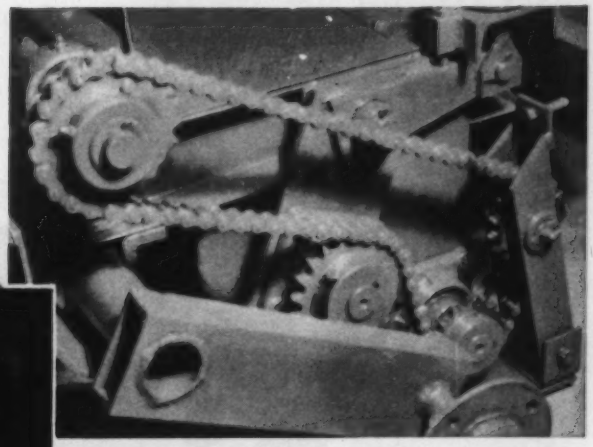
"There's no question that the costs of anodizing aluminum are appreciably lower than those of plating aluminum or steel as far as equivalent service life is concerned.

"However, there still are questions as to how comparable material costs are and how comparable final finishes are in terms of appearance and service."

"Bolt hole cracking is being overcome . . ."

"Refinishing, replating must be considered . . ."





FORMER DRIVE: The high speed operation of Gehl's Cure-All Hay Conditioner caused failure of the roller chain drive.

PRESENT DRIVE: Both the limited space and high speed requirements were met with this Gates Super HC V-Belt Drive.

Gehl Brothers Manufacturing Company Finds

Super HC V-Belt Drive handles speeds chain drive couldn't take!

Roller chain drives on Gehl's Cure-All Hay Conditioners **"would not stand up under the speed of operation." Yet conventional V-belts that would fit into the space available could not handle the working load for this outstanding line of forage harvesting equipment.**

The design problem remained a tough one until the introduction of the Gates Super HC High Capacity V-Belt early last year. Then the Gates Field Engineer, working closely with Gehl Engineers designed the new drive shown above.

"The Super HC V-Belt Drive has eliminated need for shear pins and clutches, has increased efficiency, and lowered maintenance costs," is the pleased report from Gehl personnel.

Take advantage of Super HC on your equipment

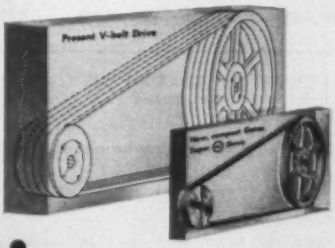
Whenever you have a drive change on a new model or are replacing belts or sheaves, let your Gates Representative show you how Super HC Drives can reduce sheave diameters 30% to 50%, drive space up to 50%, drive weight and cost as much as 20%.

A handbook, "The Modern Way to Design Multiple V-Belt Drives," is yours for the asking. Simply contact your Gates Representative listed in the Yellow Pages.

TPA 505

The Gates Rubber Company, Denver, Colorado
Gates Rubber of Canada Ltd., Brantford, Ontario

Gates *World's Largest Maker of V-Belts*



Gates Super HC V-Belt Drives

same hp capacity in smaller "package"

Now . . . Look to Lukens For Steel Shape Savings

Looks like a steel freight savings of $1663.47

The owl-eyed steel shape pictured above is a 3½" gage shackle plate. It weighs 483 lbs. and was flame cut to special tolerances in one of Lukens' fabricating shops. A customer ordering 50 of these from—say—600 miles away would pay a freight charge of only $493.89 on the pieces.

However, if the same customer decided to flame cut the parts himself, 106,800 lbs. of 3½" gage steel plate stock would be required. Cost of shipment . . . $2157.36. Extra cost to the customer on freight alone . . . $1663.47. *Plus* . . . the expense of his equipment investment . . . the tie-up of his capital in plate stock . . . the cost of handling 75% scrap . . . the problem of shop spoilage.

Moral: Don't pay freight on scrap. Contact Lukens for Steel Plate Shapes Service . . . flame cutting, shearing, blanking, bending, pressing, welding—of carbon and alloy plate produced on our own rolling mills. Call or write Fabrication Building, Lukens Steel Company, Coatesville, Pennsylvania. Address Dept. B-80.

LUKENS STEEL COMPANY
B-80 Fabrication Building
Coatesville, Pa.

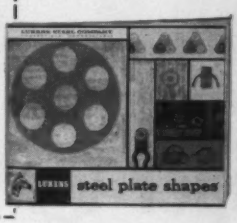
Please send me your free booklet on Steel Plates Shapes.

Name_____

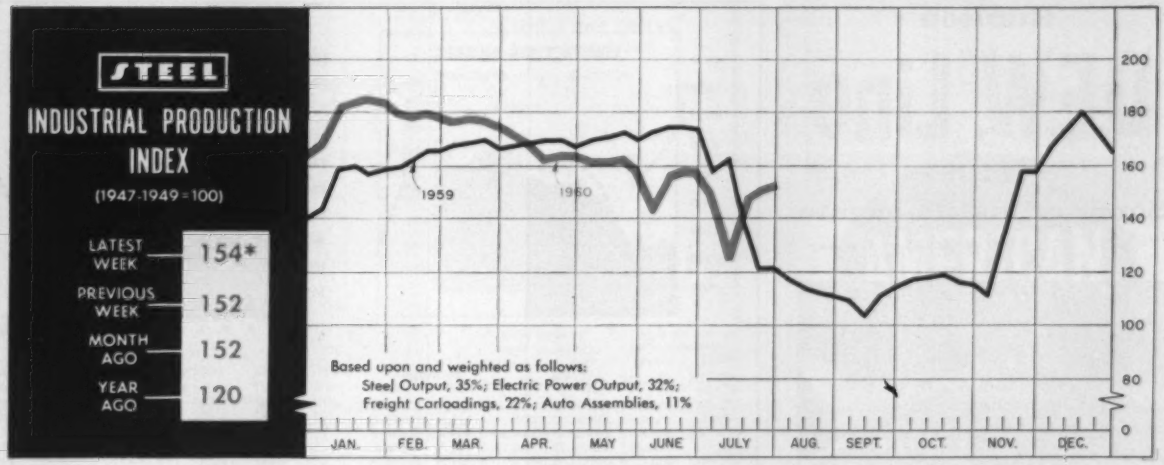
Company_____ Title_____

Address_____

City_____ Zone____ State_____



LUKENS ®



*Week ended July 30.

Turning Point Is Near for Durables

THE BATTLE LINE between the plus and minus factors in the economy is drawn up, and the sides look about even now. The outcome of the battle won't be known until shortly after Labor Day. But sentiment favors the plusses.

• **High Level Battleground** — One thing is certain: The battle is being fought at the highest level of economic activity in the nation's history. Despite the feeling of uncertainty in almost all areas of the nation, our gross national product of $505 billion (annual rate in the second quarter) is 3.5 per cent higher than it was a year earlier. And it can't be denied that total industrial production, as measured by the Federal Reserve Board at 166 (1947-49=100), is a mere 2 points below the all-time high set last January.

Furthermore, employment is at an all-time high despite a questionable increase in unemployment. (More students entered the labor market during the last count than in most comparable months of the past.) Higher employment is accompanied by higher incomes—now past the annual rate of $400 billion. As a result, retail sales are up.

• **Infighting** — When you break down the over-all economic barometers you begin to see why there is a great deal of uncertainty in the hard goods sector. While nondurable goods manufacture rose from 159 per cent of the 1947-49 base in January to 162 per cent in June, durable goods production dropped from 181 to 172. While total employment has gone up, manufacturing employment has declined with all the drop centered in durable goods industries. In retail sales, durable goods stores are lagging. Even automotive sales, which set a near record pace throughout the first half, have slackened of late.

A decline in manufacturers' new orders for steel, nonautomotive

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	1,570[1]	1,520	318
Electric Power Distributed (million kw-hr)	14,700[1]	14,425	13,577
Bituminous Coal Output (1000 tons)	7,940[1]	7,353	7,280
Crude Oil Production (daily avg—1000 bbl)	6,850[1]	6,855	6,855
Construction Volume (*ENR*—millions)	$365.5	$519.8	$333.7
Auto, Truck Output, U. S., Canada (*Ward's*)	132,030[1]	140,031	146,076
TRADE			
Freight Carloadings (1000 Cars)	625[1]	620	536
Intercity Truck Tonnage (changes from year ago)	−1.2%	−3.7%	+11.3%
Business Failures (Dun & Bradstreet)	259	258	245
Currency in Circulation (millions)[3]	$32,041	$32,199	$31,883
Dept. Store Sales (changes from year ago)[3]	+3%	+1%	+7%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$26,117	$28,465	$24,368
Federal Gross Debt (billions)	$288.9	$288.8	$289.3
Bond Volume, NYSE (millions)	$22.7	$22.5	$28.6
Stocks Sales, NYSE (thousands of shares)	13,864	12,577	15,069
Loans and Investments (billions)[4]	$105.3	$105.5	$104.7
U. S. Govt. Obligations Held (billions)[4]	$27.4	$27.5	$30.7
PRICES			
STEEL's Finished Steel Price Index[5]	247.82	247.82	247.82
STEEL's Nonferrous Metal Price Index[6]	233.2	233.2	217.6
All Commodities[7]	119.4	119.6	119.3
Commodities Other than Farm & Foods[7]	128.3	128.3	128.1

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1960, 2,849,306; 1959, 2,831,846. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-39=100. [6]1936-39=100. [7]Bureau of Labor Statistics Index, 1947-49=100.

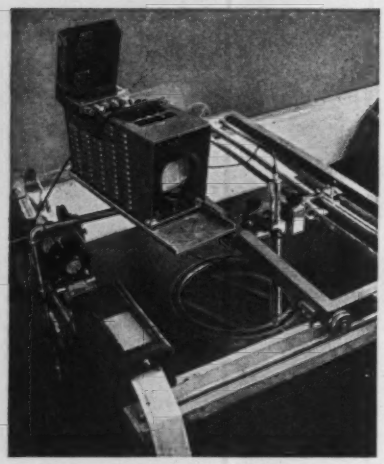
Establish your own Branson

D.E.W.* Line

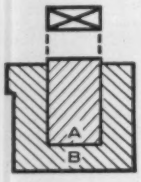
with

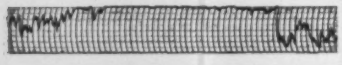
Sonoray® and Sonogate

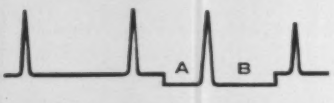
*Definite Early Warning



Early warning of internal defects prevents further waste of time and money on materials and parts that would later be rejected or fail in service / Here, for instance, a *Sonoray*® Ultrasonic Flaw Detector with accessory Model B *Sonogate* Flaw Alarm, immersion-scans a vital bi-metallic rotary seal. Every variation in bond between the two dissimilar materials is revealed on the CRT and strip-recorded as the part rotates on the submerged turntable / This is just one of the many DEW* techniques available with Branson Ultrasonic Flaw-Detection and Thickness-Gaging equipment. State your problem in detail when requesting further information.







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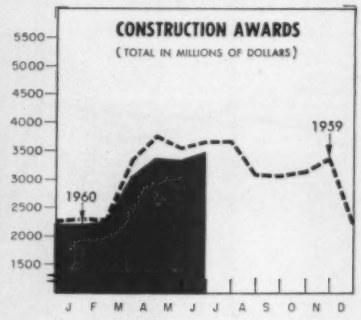
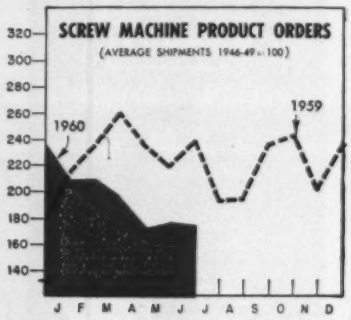
THE BUSINESS TREND



	Total 1960	Total 1959	Building 1960	Building 1959
Jan.	2,192.9	2,314.4	1,728.4	1,834.9
Feb.	2,239.5	2,307.0	1,685.1	1,777.4
Mar.	3,016.3	3,339.9	2,361.1	2,453.9
Apr.	3,359.8	3,778.4	2,527.3	3,018.0
May	3,336.7	3,541.9	2,562.5	2,748.8
June	3,472.3	3,659.0	2,592.8	2,816.9
July	.....	3,656.5	.....	2,880.8
Aug.	.....	3,083.6	.....	2,512.3
Sept.	.....	3,058.1	.....	2,472.3
Oct.	.....	3,134.5	.....	2,518.4
Nov.	.....	3,372.8	.....	1,893.0
Dec.	.....	.....	.....	1,783.4
Totals	.....	36,475.0*	.....	28,714.9*

*Monthly figures do not add up to totals because of yearend revisions.
F. W. Dodge Corp.
Charts copyright, 1960, STEEL.



	New Orders 1960	New Orders 1959	Shipments 1960	Shipments 1959
Jan.	209	215	220	193
Feb.	207	236	219	193
Mar.	198	260	241	214
Apr.	174	234	205	219
May	178	219	195	201
June	177	239	211	218
July	...	192	...	194
Aug.	...	194	...	205
Sept.	...	236	...	217
Oct.	...	243	...	243
Nov.	...	201	...	208
Dec.	...	237	...	225
Avg	...	226	...	211

*Preliminary.
National Screw Machine Products Assn.

transportation equipment, and nonelectrical machinery in June completely wiped out a slight pickup in orders for nondurable goods orders, resulting in a 1 per cent dip in total manufacturers' new orders (seasonally adjusted). Most of the inventory cutback, which accounted for the relatively small increase in gross national product during the second quarter, is accounted for by the steel and nonferrous industries.

• **Durables Counterattack** — However, many of the weaknesses are expected to disappear between now and the end of the year. Inventory cutting is nearly at an end and should take a turn for the better soon. (See Business Trend, Aug. 1, pp. 69-70.) The change should result in an upturn in manufacturers' new orders and shipments.

Plant and equipment spending is still strong, even though it may not set a record.

Construction should improve in the last half, overcoming the decline in the first half and end up at least equal to the 1959 figure of about $56 billion.

Steel production should start back up the recovery road this month and add a strong plus as the automakers push to stock up on '61 models.

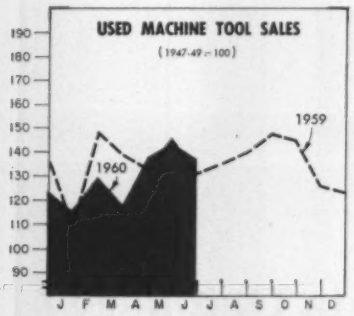
Add those developments to continued high employment, wages, and spending, and there should be an upturn of considerable size following Labor Day.

Building Outlook Improves

Of those potential plusses, construction appears to be one of the most promising. After getting off to a slow start, contract awards for future work have been gaining strength, reaching the year's high in June, reports F. W. Dodge Corp. (See table and graph above.) And even though Dodge's figures do not substantiate it yet, many believe that housing starts are about to turn up.

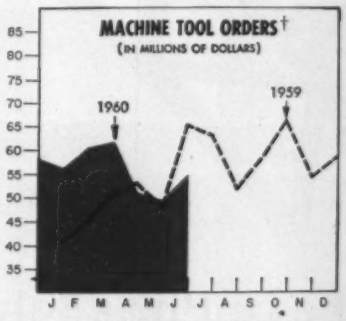
Further basis for the impending upturn is the report from Dun & Bradstreet Inc.: Building permits in 199 cities in June totaled almost $821 million, the highest point of either 1959 or 1960.

Engineering News-Record says the trend continued in July, which was the third month this year to set a record. Although not quite as good as June (which was the second best month on record), last month topped the year-ago period



	1960	1959	1958	1957
Jan. ...	115.0	109.5	121.1	n.a.
Feb. ...	129.3	148.1	121.9	n.a.
Mar. ...	117.8	139.3	106.3	n.a.
Apr. ...	137.5	132.9	105.0	152.1
May ...	143.2	145.7	99.5	132.6
June ...	137.2	131.3	111.9	137.0
July ...	....	135.3	115.0	125.3
Aug. ...	....	139.7	93.4	115.6
Sept. ...	....	147.8	113.6	117.0
Oct. ...	....	145.2	128.8	108.9
Nov. ...	....	126.8	122.3	104.5
Dec. ...	....	123.1	135.2	87.7
Avg ...	....	135.4	114.5	128.9

n.a.=not available.
Machinery Dealers National Assn.



	New Orders (000 omitted) 1960	1959	Shipments (000 omitted) 1960	1959
Jan.	$56,150	$41,050	$46,400	$31,300
Feb.	60,600	45,400	51,950	36,050
Mar.	61,950	51,550	64,500	45,750
Apr.	51,850	53,200	55,100	45,000
May	49,950	48,700	56,350	41,000
June	55,000*	65,400	64,250*	50,050
July	.....	63,400	.....	40,600
Aug.	.....	52,200	.....	40,300
Sept.	.....	58,850	.....	46,150
Oct.	.....	66,650	.....	51,500
Nov.	.....	54,250	.....	46,600
Dec.	.....	58,300	.....	63,850
Totals	.....	$658,950	.....	$538,150

†Metal cutting and metal forming.
*Preliminary.
National Machine Tool Builders' Assn.

by 5 per cent on a weekly average basis. The year to date is 8 per cent ahead of the corresponding period of 1959 and slightly better than the record pace of 1956.

Association Head Sees Decline

Not everybody in metalworking sees a kickup in the immediate future. Orrin B. Werntz, executive vice president of National Screw Machine Products Association, feels that an apparent upturn in the fourth quarter may fool some people. In reality, he says, we are in the beginning stages of the down cycle. His own industry, which he feels runs ahead of the pack, is already in a downturn which started either late last year or early in 1960. By historical standards, the industry's cycle is 30 months on the down side and 20 months on the up side. If the late 1959 starting time is correct, the upturn isn't due until early 1962. (For the current position of the industry, see table and graph, Page 74.)

The recent performance of the fastener industry tends to support that view. After starting out well in the first quarter, shipments nosedived in April and remained at a low level. The shipment index of the Industrial Fasteners Institute was at 98 per cent of the 1956-58 base in June, only 3 points above the level in April and May.

In contrast, the gear industry, which is also considered a bellwether for metalworking, had the second best month of the year in June, reports the American Gear Manufacturers Association. Bookings registered 269.8 (1947-49 = 100), and shipments set a high for the year at 253.6 per cent of the base period. Generally speaking, gears have been in strong demand all year.

Index Up Again

STEEL's industrial production index advanced for the third consecutive week during the period ended July 30. At a preliminary 154 (1947-49 = 100), the trend line is still 5 points beneath the highest point in June. Among the components of the index, only the output of electricity is rising above the pre-Fourth of July level.

A further rise in electricity output and a minor rise in both steel production and railroad freight carloadings may be sufficient to offset the seasonal cutbacks in auto production early this month.

. . . . . for air separation plants designed for steel mill applications, think *first* of American Messer.

AMERICAN MESSER CORPORATION
Chrysler Building, 405 Lexington Ave.
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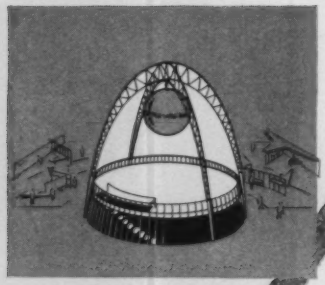


Theme Tower Symbol of the 1960 Metal Show

Why we plan to be in Philadelphia October 17

"Rarely has a meeting meant so much to me as this one. Needless to say, it is a real privilege to be able to participate in this nationally known event, in the many excellent papers to be given, the opportunities to meet old friends and new, and to further our profession."

V. F. Zackay, Supervisor
Physical Metallurgy Section
Metallurgy Department
Scientific Laboratory
FORD MOTOR COMPANY

"The problem of keeping abreast of new developments in today's rapidly changing technology is always difficult. The Metal Show, through its audio-visual presentations of current advances in knowledge, presents a time-condensed package for those interested in metals engineering and processing."

R. F. Thomson, Head
Metallurgical Engineering Dept.
Research Laboratories
GENERAL MOTORS CORP.

The experts see the value of the 1960 Philadelphia Metal Show — they know how stimulating it will be, and that's why they plan to attend. They know that a new emphasis on the essential metals and materials, processes and techniques will make the 1960 Show more valuable than ever before . . . a truly dynamic forum . . . some 300 exhibits and 250 technical papers. Attendance will be a sound investment for you and your company!

"The opportunity to attend the Metal Show should be particularly rewarding this year with the participation of many outstanding metal organizations. I anticipate making and renewing acquaintances with professional people who share my interest in metallurgical matters. It is also a worthwhile experience to attend the presentation of carefully selected technical papers and to participate in the resulting discussions."

R. D. Chapman,
Asst. Chief Engineer
Basic Sciences Research
CHRYSLER CORPORATION

NATIONAL METAL CONGRESS and EXPOSITION

Philadelphia Trade & Convention Center • October 17-21

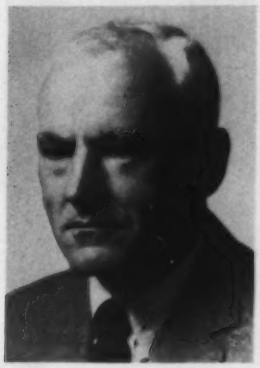
Sponsored by the AMERICAN SOCIETY FOR METALS *Metals Park • Novelty, Ohio*

Cooperating Activities: The Metallurgical Society of AIME; Society for Non-destructive Testing, Inc. Associations presenting technical sessions in cooperation with ASM: Metal Powder Industries Federation; Metal Treating Institute; Ultrasonic Manufacturers' Association; Industrial Heating Equipment Association; Special Libraries Association—Metals Division; American Society for Testing Materials—Committee B-9; and extensive research and engineering programs of the American Society for Metals, and ASM Seminars.

R. C. COLBAUGH JR.

OSCAR PEARSON

JAMES W. KINNEAR JR.



JOHN E. ANGLE

U. S. Steel and TC&I Div. appointments

United States Steel Corp., Pittsburgh, has advanced four men at the vice president level. The company named **James W. Kinnear Jr.** vice president-steel producing divisions, a new position, in Pittsburgh. Succeeding Mr. Kinnear at Birmingham is **Oscar Pearson,** promoted to executive vice president, U. S. Steel's Tennessee Coal & Iron Div. Moving up to Mr. Pearson's former position of administrative vice president-steel producing divisions, is **John E. Angle.** He was formerly vice president-industrial engineering. Assuming this post now is **R. C. Colbaugh Jr.** Mr. Colbaugh was assistant vice president-industrial engineering.

Elected executive vice president, **Vega Industries Inc.**, Syracuse, N. Y., was **Paul W. James.** He was vice president-manufacturing.

Charles T. Lathrop was promoted to mechanical superintendent, **Alco Products Inc.**, Auburn, N. Y. He will be at Schenectady, N. Y. Succeeding Mr. Lathrop as plant manager at Auburn Div. was **Walter E. Short.**

Elected vice president-engineering, **Titeflex Inc.**, Springfield, Mass., was **Richard G. Walsh.** Titeflex Inc. is a subsidiary of Atlas Corp.

Robert H. Hood was named vice president-sales, **Hi-Press Air Conditioning of America Inc.**, New York. He was manager-marine sales.

Named chief engineer, **Bradley Semiconductor Corp.**, New Haven, Conn., was **Thomas C. Pridmore.**

Elected executive vice president, **Production Tooling Co.**, Houston, was **W. N. Wilkerson.** Mr. Wilkerson is also president John T. Everett & Co. and W. N. Wilkerson & Co. He will also serve on Production Tooling Co.'s board.

Appointed director, production planning and control, **Chase Brass & Copper Co.**, subsidiary, Kennecott Copper Corp., was **David M. Andrews.** He will remain at Waterville, Conn., where he was general superintendent, Chase Metal Works plant.

Robert W. Reinicke was promoted to vice president-operations, **Ansul Chemical Co.**, Marinette, Wis. He comes to Ansul from Ekco Products Co., Chicago. General managers of the company's three product line divisions — chemicals, refrigeration components and fire equipment— will report to Mr. Reinicke.

Union Carbide Metals Co., division of Union Carbide Corp., New York, has chosen **John C. Douglas** vice president - operations and **David Swan** vice president-technology. Mr. Swan succeeds Mr. Douglas. Mr. Swan was manager-planning.

Crown Zellerbach Corp., San Francisco, has named **Dr. W. M. Hearon** vice president for research and development, a new post. Dr. Hearon will also continue as general manager of the company's Chemical Products Div. He will be located in San Francisco. **Dr. John S. Barton** was appointed director, Central Research Div., Camas, Wash.

Hans G. Fiedler was elected senior vice president, **Textile Machine Works,** Reading, Pa.

Joseph A. Frabutt was elected president and a director, **W. L. Maxson Corp.**, New York. He succeeds **W. H. Beal,** elected chairman of the board. Mr. Frabutt was president, Gonset Co., Burbank, Calif.

Named vice president, **Cometals Inc.**, subsidiary, Commercial Metals Co., Dallas, was **N. J. Muskin.**

Roland H. Reinisch Jr. has joined **J & D Transformers Inc.**, Rochester, N. Y., as vice president and purchasing agent. He was purchasing agent with Caledonia Electronics & Transformer Corp.

James M. Wallace was appointed manager, **Westinghouse Electric Corp.'s** Manufacturing & Repair Div., Pittsburgh. He succeeds **Herman R. Larson,** retired. Mr. Wallace was assistant manager.

Named manager, engineering and production, **Magnetic Metals Co.'s** Western Div., was **Robert Coats.** He will direct process and design engineering as well as manufacturing at the company's new Newport Beach, Calif., plant.

James W. Dopp was named vice president, **Lapointe Machine Co.,**

VERNON MARSH
American Pulley mgr.

IRA KAMEN
Portland Industries pres.

STANLEY J. GILLEN
Ford Steel Div. gen. mgr.

ANTON E. CHRISTENSEN
Magnaflux mgr.-eng.

Hudson, Mass. He will continue as sales manager.

Named factory manager for **American Pulley Co.**, Philadelphia, division of Van Norman Industries Inc., is **Vernon Marsh.** He was general manager, factory operations, Kromex Co., Cleveland.

Joseph W. Duba was made Cincinnati branch sales manager, **Crucible Steel Co. of America.** He succeeds **Richard J. Rand,** made Pittsburgh sales branch manager to succeed **David R. Wistar.** Mr. Wistar was named manager, Chicago branch.

Elected vice president of **Donner Scientific Co.**, subsidiary of Systron-Donner Corp., Concord, Calif., was **Richard D. Hanson.** For the last three years, he was manager of manufacturing.

John H. Torreano was named superintendent, **Republic Steel Corp.'s** Tobin ore mine, Crystal Falls, Mich. He succeeds **Edwin H. Anderson,** retired.

Ira Kamen was elected president of **Portland Industries,** South Portland, Maine. He was vice president, General Bronze Corp. A widely known space technology expert, Mr. Kamen has written five textbooks and 150 technical papers.

Stanley J. Gillen was appointed general manager, **Ford Motor Co.'s Steel Div.** He succeeds the late **William J. Reilly.**

Appointed sales manager, Chicago District, **C. A. Roberts Co.**, was **R. Noble Gibson.** He was sales-vice president, Mid-West Forging & Mfg. Co.

Dr. Van W. Bearinger was made director of research for **Minneapolis-Honeywell Regulator Co.**, Minneapolis.

Birny Mason Jr. was elected president, **Union Carbide Corp.**, New York. Formerly executive vice president, Mr. Mason succeeds **Howard S. Bunn,** elected vice chairman of the board, a new post.

Anton E. Christensen was named manager of engineering, **Magnaflux Corp.**, Chicago. Other appointments: **Henry N. Nerwin,** chief engineer - electronics; **James E. Heath,** vice president-manufacturing; **Hamilton Migel,** vice president-planning new products, product development; **Donald T. O'Connor,** director of research and development.

Lee M. Arbegast was chosen Massena, N. Y., Works manager, **Aluminum Co. of America,** effective Sept. 1. He succeeds **Norman B. Lane,** transferred to the company's Tennessee fabricating works on special assignment.

Roy D. Wilson was appointed general manager of **F. J. Stokes Co. of Canada Ltd.**, subsidiary of F. J. Stokes Corp., Philadelphia. He was sales engineer.

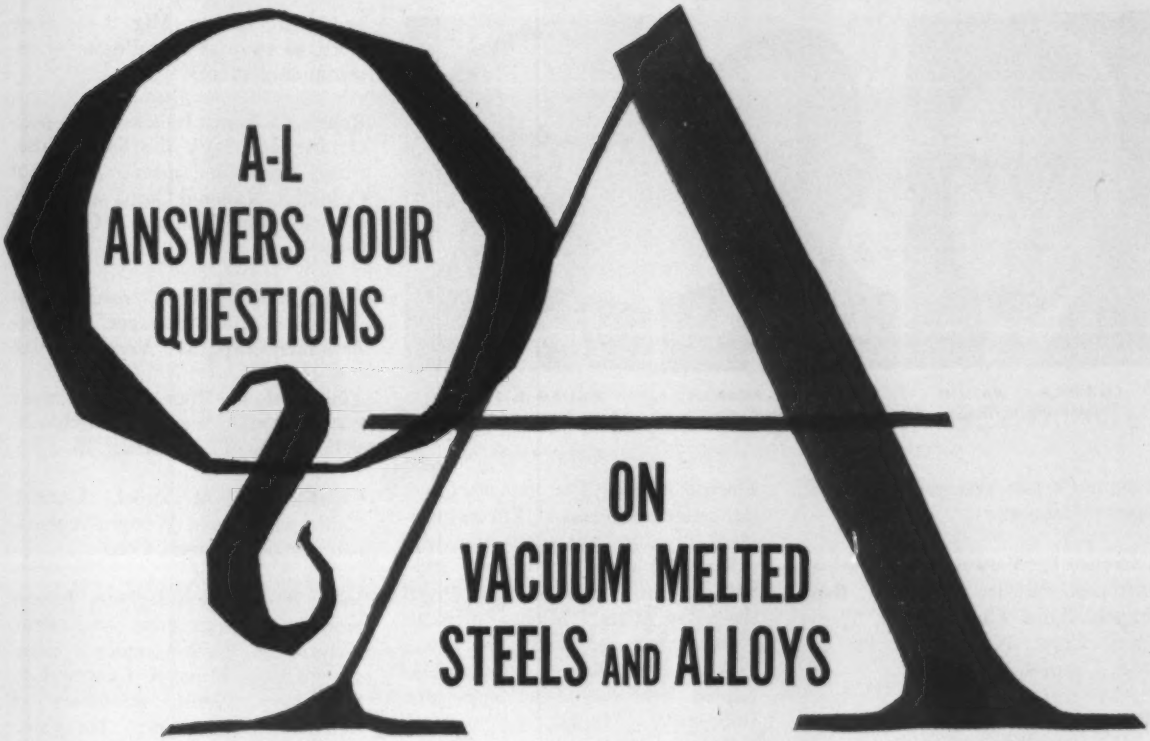
C. Harold Hannan was made director of research, **Miniature Precision Bearings Inc.**, Keene, N. H. Mr. Hannan will direct activities at the

RICHARD D. HANSON
Donner v. p.

JOHN H. TORREANO
moves up at Republic

BIRNY MASON JR.
Union Carbide pres.

ROY D. WILSON
Stokes Co. gen. mgr.



Q. Where are vacuum melted alloys best suited?

A. For exacting applications—including materials for rockets, missiles, and jet engines. And other places where expensive machined parts are involved. In highly stressed parts where failure is highly costly. Where increased reliability is vital.

Q. What are the advantages of A-L vacuum melted alloys?

A. You get parts with optimum quality for critical applications—higher mechanical properties, better fatigue strength, improved toughness, and better transverse ductility. You also get maximum insurance against internal defects through improved cleanliness and decreased gas content. And hot and cold workability are improved, the material is more homogeneous, and properties are better.

Q. How are these metals made?

A. A-L uses all three of the vacuum melting processes. Consumable electrode vacuum arc remelting is used to produce A-L Consutrode® steels and alloys in ingots up to 20,000 pounds in weight. Induction vacuum melting is used to produce 2,000 pound heats of Allegheny Ludlum Invac materials. And remelting Invac electrode stock by the consumable electrode process produces A-L Invacutrode steels and alloys that have the best possible combination of chemistry control, cleanliness, and homogeneity.

Q. Specifically, what metals are available in A-L's premium quality melting?

A. Most of the steels and special alloys—low alloy steels, bearing steels, stainless steels, tool and die steels, and high temperature steels and alloys.

Q. In what forms are these A-L special steels available?

A. In all commercial mill forms—plates, sheet, strip, billet, bar, wire, tubes, and even extrusions.

Q. How do these vacuum melted alloys compare in cost with ordinary alloys?

A. Naturally vacuum melting costs more. Consutrode alloys are the least expensive, followed by Invac alloys and Invacutrode alloys. Their use is economically justified by the improvement of quality in the finished part, the quality required by the severity of the manufacturing process involved, and the increase in the yield of sound parts.

Q. Where can I get more information?

A. Ask your A-L representative for your copy of "Modern Melting at Allegheny Ludlum." It gives technical data on the new melting techniques and quality improvements in materials. Or write: *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pennsylvania. Address Dept. S-8-1.*

ALLEGHENY LUDLUM

PIONEERING on the Horizons of Steel

2256

CLARENCE E. WATSON
joins Univac Div.

WILLIAM I. NORMAN
Armco Steel mgr.

WILLIAM F. PURVES
Elec. Autolite Ltd. pres.

company's new research and development laboratory.

Clarence E. Watson, was named director of industry marketing, **Remington Rand Univac Div.,** Sperry Rand Corp., New York. He was with Crane Co.

William I. Norman was appointed manager of the Zanesville, Ohio, Works, **Armco Steel Corp.** He succeeds **Ross Little,** retired.

Walter A. Spies Jr. was named manager - sales and engineering, **Wagner Div.,** National - Standard Co., Secaucus, N. J.

Named managing director, Wilmington, Del., plant, **Eastern Malleable Iron Co.,** Naugatuck, Conn., was **James W. Green Jr.** He was with American Brake Shoe Co.

Coggins-Owens Co., Baltimore, has chosen **R. D. Casey** vice president-sales. He was with Lamson & Sessions Co.

Charles E. K. Fox was made plant manager, Danville, Va., Works, **Disston Div.,** H. K. Porter Company Inc., Philadelphia.

Pierre J. Tapernoux was appointed systems design manager, **Stromberg-Carlson Electronics Div.,** General Dynamics Corp., Rochester, N. Y. He was head of the company's systems analysis section, electronic systems department.

Robert J. Weesner was named vice president-sales and engineering, **Imperial Electric Co.,** Akron.

Electric Autolite Co., Toledo, Ohio, has named **William F. Purves** president of Autolite's Canadian subsidiary, Electric Autolite Ltd., Sarnia, Ont. He was manager of the Bay City, Mich., division. Named manager at Bay City was **Jack B. Schneider.** Autolite also named two new chief engineers: **Robert W. MacKay** (generators) and **Roger DeYoung** (alternators).

W. F. Brazeau succeeds **M. O'Grady,** retired, as president of **American Steel Export Co. Inc.,** New York.

Joseph G. MacIsaac was made asistant superintendent, Open Hearth Dept., Sydney, N. S., Works, **Dominion Steel & Coal Corp. Ltd.**

Sparton Railway Equipment Div., Sparton Corp., named **W. Bradley Gilkey** to the new post of supervisor of marketing services for the U. S. He operates from Detroit. He is replaced as central regional manager, Chicago, by **Kenneth E. Martin.**

Bailey Meter Co. appointed district managers: **K. E. Atwood** was named manager, Pittsburgh district; **P. B. Smith,** Seattle; and **L. F. Monahan,** Denver.

Roger Thomas was made Chicago regional sales manager, **Mid-West Abrasive Co.**

John T. Lurcott was made territorial sales manager, metropolitan New York area, for **Alloy Tube Div.,** Carpenter Steel Co.

M. R. Swain was appointed vice president, **Rheem Mfg. Co.,** New York, to serve as co-ordinator of international affairs.

Robert C. Lantz Jr. was made purchasing agent for the Santa Rosa, Fla., zirconium metal plant of **Columbia-National Corp.,** subsidiary of Columbia-Southern Chemical Corp.

C. L. McDougall was made assistant parts sales manager, **Cooper-Bessemer Corp.,** Mt. Vernon, Ohio.

Townsend L. Way Jr. was made assistant sales manager, **Richards-Wilcox Mfg. Co.,** Aurora, Ill.

Charles W. McDaniel, Carmel, Calif., was named Western regional manager for **Fostoria Corp.**

John F. Van Landeghem, former product manager-sheet and strip, was named Eastern regional manager, **Chase Brass & Copper Co.,** Waterbury, Conn., subsidiary of Kennecott Copper Corp. He is succeeded by **Ralph Stroth,** previously Chicago district manager, who in turn is replaced by **Homer D. Gebauer.**

Charles A. Vana was named director of research, **Gas Atmospheres Inc.,** Cleveland.

Harvey B. Jordan, one of the steel industry's best known executives and production specialists, retired this month after 46 years' service with **United States Steel Corp.** Mr. Jordan was executive vice president and chairman of the general administration committee.

OBITUARIES...

Isador Glueck, 79, secretary of **Brass and Bronze Institute,** Chicago, died July 13.

Daniel E. Kelly, 76, former vice president and director, **Electric Autolite Co.,** Toledo, died July 27.

Lloyd Sherman Jamieson, vice president and general manager, **Robertsteel (Canada) Ltd.,** died July 22.

Charles Vallone, 82, retired vice president, **Barcalo Mfg. Co.,** Buffalo, died July 25.

NEW POWER-CRATER Engine in 3 NEW "F" SERIES LIFT TRUCKS

gives outstanding performance ... unequalled economy

F30-24
3000-lb capacity

F40-24
4000-lb capacity

F50-24
5000-lb capacity

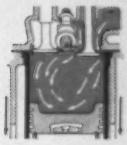
Superior mixing of fuel and air in POWER-CRATER engine gives the new "F" series trucks maximum power out of every drop of fuel . . . also a new high in combustion efficiency resulting in new fuel economy.

Greater power, coupled with proper balance and weight distribution, results in top all-around performance.

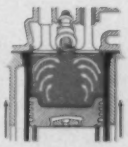
Let your Allis-Chalmers dealer show you what the POWER-CRATER engine — plus other outstanding features of the new "F" series trucks — can mean to you in terms of performance and savings. Send for Bulletin BU-640. Allis-Chalmers, Milwaukee 1, Wisconsin.

POWER-CRATER is an Allis-Chalmers trademark.

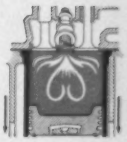
Inside story of POWER-CRATER engine performance



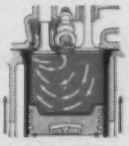
1 **EFFECTIVE MIXING** of fuel and air begins during intake, with swirling turbulence set up by unique crater-shaped piston — an Allis-Chalmers development.



2 **FINAL THOROUGH BLENDING** takes place during the compression stroke, as the violent turbulence continues.



3 **COMPLETE COMBUSTION** results from this proper blending of fuel and air.



4 **QUICK-CLEARING EXHAUST**— burnt gases clear rapidly and completely through large clear-flow manifold, permitting maximum air-fuel charge on intake.

BH-141

ALLIS-CHALMERS

POWER **FOR A GROWING WORLD**

U. S. Steel to Build Huge Blast Furnace at Duquesne

U. S. STEEL CORP. will build an ultramodern blast furnace with a 28 ft hearth at its Duquesne (Pa.) Works which ultimately will replace certain older, smaller furnaces in the area.

The furnace will help the corporation meet long range needs for molten iron to supply steelmaking furnaces in the Monongahela Valley. It will incorporate advanced design features that will enable its use in research studies into blast furnace operating problems.

EDWIN H. GOTT

Included in such studies will be the effects of high top pressures approaching 30 lb; high, hot blast temperatures in the range of 2000° F; controlled sizing of the burden; automatic probing of the stock column; and advanced instrumentation, says E. H. Gott, executive vice president-production.

The new furnace is scheduled to be completed in two years and is expected to produce about 850,000 tons of molten iron annually. Contributing to this high rating will be the design features and availability of beneficiated iron ore from the corporation's new sintering plant at Saxonburg, Pa.

The furnace will be designated No. 6, the same as an existing furnace which will be dismantled as the first step of the construction project, since it occupies a portion of the site selected for the new installation.

The project will include the furnace itself, three hot blast stoves, a new raw material trestle, a turboblower, and other related auxiliary equipment.

Sheffield to Get Oxygen

Linde Co., a division of Union Carbide Corp., New York, will supply up to 100 million cu ft of oxygen per month to the Houston Works of Sheffield Div., Armco Steel Corp. The oxygen will be produced by a plant which Linde will build and operate in the Houston ship channel area. Linde will also construct a pipeline to deliver the oxygen to Sheffield's mill.

Sheffield is increasing the use of oxygen in its open hearth and electric furnaces to speed the making of steel and increase its productive capacity, without additional capital investment. This will reduce the cost per ton of steel produced and help meet increasing foreign competition in Sheffield's normal market area, says K. P. Campbell, works manager.

Air Products Opens Plant

Air Products Inc., Allentown, Pa., officially opened its $6 million, liquid oxygen plant at Creighton, Pa. The facility, near Pittsburgh, has a daily capacity of 200 tons of liquid oxygen and liquid nitrogen, plus substantial quantities of argon. The plant will serve also as a distributor for other industrial gases.

The Air Products oxy-fuel lance was demonstrated as part of the dedication ceremonies. The lance is part of a new open hearth furnace technique which makes possible substantial increases in steel production by driving additional quantities of heat into the furnace at a high rate. Such lances are being installed at a steel mill (two per furnace) and will drive in heat at the rate of 50 million Btu per hour each.

Container Firm Expanding

Steel & Tin Products Co., Baltimore, manufacturer of metal containers, will complete a 25,000 sq ft addition to its plant in October. L. B. Meacham is president.

Forms International Div.

Parker-Hannifin Corp., Cleveland, has established an International Div. A subsidiary of the division, Parker-Hannifin NV, at Amsterdam, Holland, will function as a sales outlet, warehousing distributor, and service facility for Europe. Paul F. Smith heads the international operation.

Anchor Installs Equipment

Anchor Fence Div., Anchor Post Products Inc., Baltimore, has installed additional equipment for the production of aluminum chain link fencing. C. W. Burton Jr. is president.

Twin Coach Forms Division

Twin Coach Co., Buffalo, producer of aircraft, missile, and vehicle parts, organized a Special Products Div. at Waverly, N. Y. The division will initially produce trailers.

Baird Offers New Machine

Baird Machine Co., Stratford, Conn., has purchased a new line of spring manufacturing machines from the Clay Engineering & Mfg. Co., Chicago.

Taylor Chain Extends Line

S. G. Taylor Chain Co. Inc., Hammond, Ind., has equipped its plant for the manufacture of weldless and stamped chain. The equipment was purchased from Carroll Chain Co., Columbus, Ohio.

Thermo Electric Renamed

Thermo Electric Mfg. Co., Dubuque, Iowa, changed its name to Thermolyne Corp. Products of the

firm include furnaces, temperature controlling and indicating instruments, laboratory hot plates, and magnetic stirring hot plates.

Mueller Buys Foundry

Mueller Industries Inc., Wausau, Wis., purchased the foundry facilities of the Koehring Div., Koehring Co., Milwaukee. Mueller operates several foundries, including Love Bros.-Pyott Foundry in Aurora, Ill., which will be moved to Milwaukee. The Koehring foundry will become a part of that organization.

Mallory Renames Division

P. R. Mallory & Co. Inc., Indianapolis, changed the name of Electronic Timers Co. (one of its operating divisions) to Mallory Timers Co., effective Sept. 1. The division has its offices in Warsaw, N. Y.; research facilities there and in Rochester, N. Y.; and plants in Warsaw, Mt. Morris, N. Y.; and Pana, Ill.

Nalco Chemical Expanding

Nalco Chemical Co., Chicago, purchased about 10 acres and four buildings in the Clearing Industrial District, that city. The buildings will be modernized and converted into laboratory, office, and manufacturing facilities. The company manufactures industrial chemicals.

Plans Tube Mill in Italy

Rheem Mfg. Co., New York, and Italian associates will establish a subsidiary company to make up to 100,000 tons of medium diameter, welded steel tubes in a new plant at Palermo, Sicily. Production is scheduled to start in March, 1961. The Rheem group is also studying a proposal to build another plant in southern Italy to produce pipes up to 90 in. in diameter and large tanks.

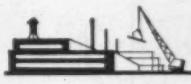
Extends Aluminum Service

Hunter & Havens Inc., Bridgeport, Conn., has begun aluminum operations from its 15,000 sq ft plant addition. The building will accommodate 1,750,000 lb of aluminum extrusions and bars. Sheet and plate shearing will be available to its customers later this month.

CONSOLIDATIONS

Henry G. Thompson & Son Co., New Haven, Conn., purchased **Marshall Steel Co.**, La Grange, Ill. Thompson makes hacksaw and bandsaw blades and is an industrial supply distributor. Marshall Steel offers ground flat stock, drill rods, and dowel pins.

Federal Pacific Electric Co., Newark, N. J., acquired **Pioneer Electric Ltd.**, Winnipeg, Man., producer of electrical equipment.



NEW PLANTS

A facility for experimental, contract, and production machine tool and die design and manufacture is being constructed in Cedar Falls, Iowa, for the **H & H Machine Tool Co.**, Dayton, Ohio. It will be operated as a separate corporation (H & H Machine Tool Co. of Iowa) with these officers: President and treasurer, R. T. Hipple; vice president, Glendora Hipple; and secretary, S. C. Jacobsen.

Reynolds Aluminum Supply Co., Atlanta, is constructing a 55,000 sq ft distribution center. The building will increase the firm's operating facilities in that city by 61 per cent.

Q-T Tool Co., Bedford, Ind., completed construction of manufacturing facilities for production of standard and special cutting tools. It contains 10,000 sq ft of space.

Brush Beryllium Co., Cleveland, opened a fabrication plant at 24353 Clawiter Rd., Hayward, Calif. The firm is increasing production capacity of its fully integrated beryllium facilities at Elmore, Ohio, and is moving its alloy precision rolling mill in Reading, Pa., to larger quarters at Shoemakersville, Pa.

Sola Electric Co. will move all operations from Chicago to Elk Grove Village, Ill. The firm makes electrical and electronic products and components and is a division of Basic Products Corp., Milwaukee. The new $3 million plant provides about 200,000 sq ft of floor space.

M. S. Millett Inc., Baltimore, is erecting a 16,000 sq ft plant at Cockeysville, Md. Additional machinery will be installed prior to the transfer of present equipment.

NEW OFFICES

New Jersey Zinc Co., New York, established a district sales office at 878 York Ave. S.W., Atlanta 10, Ga. Robert W. Munson is Southern district sales manager.

Lincoln Engineering Co., St. Louis, established a branch office and warehouse at 1845 Marietta Blvd. N.W., Atlanta 18, Ga. J. P. O'Donnell will direct the branch operation. Lincoln makes lubrication equipment, air compressors, and ignition system testing equipment.

NEW ADDRESSES

Chromalloy Corp. moved into a 43,000 sq ft plant at 171 Western Highway, West Nyack, N. Y. The firm's Sintercast Div. is expected to move from Yonkers, N. Y., to the new plant later this year. Chromalloy's Propellex Chemical Div. remains at Edwardsville, Ill., and the Elyria Foundry Div. at Elyria, Ohio.

Glenn W. Holcomb, Oregon State College, Corvallis, Oreg., is the official nominee for president of the **American Society of Civil Engineers**, New York, for the year 1960-61.

Nominations of officers for the Producers' Council Inc. (manufacturers of building materials and equipment), Washington, are: President, E. A. Lundberg, Pittsburgh Plate Glass Co., Pittsburgh; first vice president, D. A. Proudfoot, Simpson Timber Co., Seattle; second vice president, R. W. Lear, American Radiator & Standard Sanitary Corp., New York; secretary, E. F. Bennett, Koppers Co., Pittsburgh; and treasurer, Hal Cramer, Westinghouse Electric Corp., Pittsburgh.

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5-4-5

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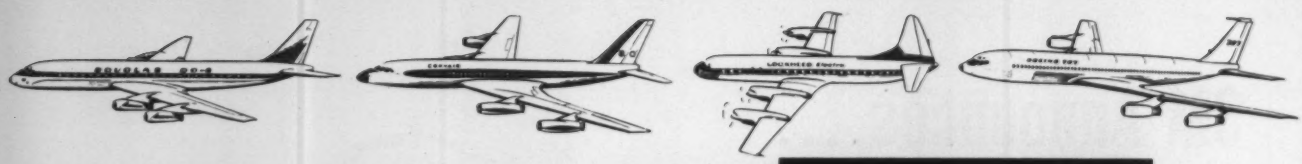
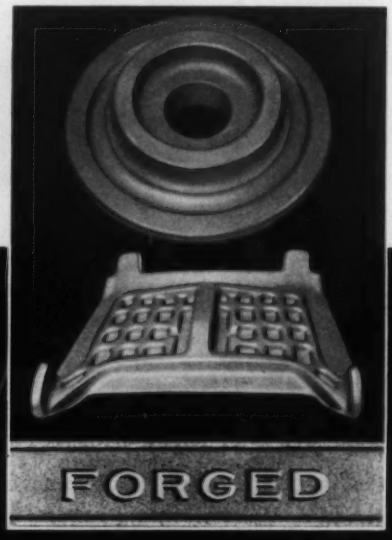


Over 1000 Wyman-Gordon forgings pace advanced jet designs



EST. 1883

Largest closed-die forging ever made for commercial aircraft

The forging of these 657 lb. bulkheads presented unusual problems of die design, forging, and handling. The successful solution of these problems saved costly assembly of many smaller parts —costly both in terms of dollars and pounds.

From this huge main bulkhead forging to the engine parts above, Wyman-Gordon forgings are in wings, fuselage, landing gear and engines of the newest commercial jet aircraft. These and a great variety of other vital components are forged from many types of materials; steel, aluminum, magnesium, titanium, as well as many new uncommon alloys.

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FORGINGS

of Aluminum Magnesium Steel Titanium . . . and Beryllium Molybdenum Columbium and other uncommon materials

HARVEY ILLINOIS — WORCESTER MASSACHUSETTS — DETROIT MICHIGAN

GRAFTON MASSACHUSETTS — LOS ANGELES CALIFORNIA — PALO ALTO CALIFORNIA — FORT WORTH TEXAS

Technical Outlook

FORGING WITH A BANG—Aluminum forgings made with explosive methods are considered reliable, says an Air Force report. It details expenses, restrictions, advantages, and limitations of the method. (Ask for PB 161457, Department of Commerce, Office of Technical Services, Washington 25, D. C. Price: $1.75.)

WHY COLUMBIUM OXIDIZES—It was believed that the first oxide coating on columbium gave temporary protection against corrosion. Not so, says the National Bureau of Standards, Washington. Oxidation actually increases because the growth of porous columbium pentoxide continually uncovers fresh metal for more oxidation. Protective coatings appear to be necessary for temperatures above 750° F.

WHISKER RESEARCH— You can buy magnesium oxide whiskers 0.001 to 0.005 in. round by 0.15 in. long if you want to study physical characteristics and properties. Semi-Elements Inc., Saxonburg, Pa., will use them to produce a better semiconductor having high mobility and energy band gap properties at much higher temperatures than are common today.

IMPROVES THORIUM AND RHENIUM— Kennecott Copper Corp., Salt Lake City, Utah, has found a way to separate thorium and rhenium from their ores in much higher purities than has been possible. Organic compounds are the key.

FASTER INSPECTION— What's said to be one of the largest cobalt 60 sources in the U. S. (1430 curies) is used to inspect castings at the Quaker Alloy Casting Co., Myerstown, Pa. Steel sections 8 in. thick can be handled in about 5 minutes, says Radionics Inc., Norristown, Pa. Cost: Under $20,000. A comparable amount of radium costs $40 million.

DEPLETED URANIUM USES— Here are some applications suggested by Battelle Memorial Institute: As an alloying element for tool steels, a scavenger for impurities, a spheroidizing agent in nodular iron, a strengthening agent in dispersion hardening, a gamma ray shield, a constituent of bearing metals and high density alloys. Battelle adds: If consumption could be increased, the price might be brought down to $2 a pound—within the range of alloying grades of tungsten and molybdenum.

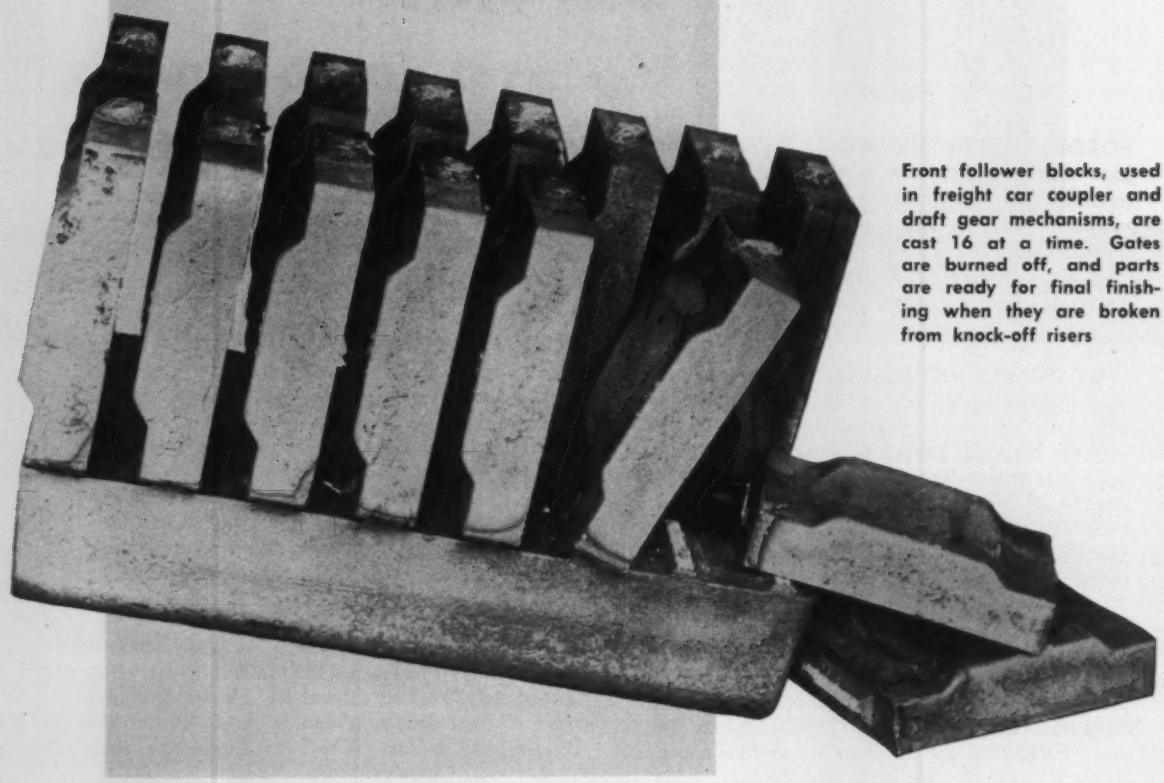
HELIUM COOLS VACUUM FURNACE— Safer production of reactive and refractive metals is promised by a new furnace which combines the advantages of permanent electrode skull melting with consumable electrode vacuum arc melting, says the maker, National Research Corp., Cambridge, Mass. The reason: Helium replaces water in cooling the skull. Metals such as titanium can explode when water coils rupture during melting process.

PAINT RESISTS 2300° F—The Navy has a nonvolatile, alkyd paint which fails to ignite when heated to 2300° F. Chemistry allows thinning with mineral spirits; it can be applied over old primers and paints. The key: Chlorendic acid, says Hooker Chemical Corp., Niagara Falls, N. Y.

ELECTRIC POWER NOTE—Foreign sources report some success with direct current power transmission, says W. E. Gutzwiller, Allis-Chalmers Mfg. Co., Milwaukee. Development of efficient direct current devices (thyratron, semiconductors, and thermoelectric generators) have stimulated the interest, he says.

SPEEDS GRAPHITE PRODUCTION—Commercial graphite can now be produced in 2 hours instead of 90 days, claims John M. Neff, director of ceramics research, Armour Research Foundation of Illinois Institute of Technology, Chicago. A new binder it developed cuts out the slow, tedious baking operation.

ALLOY BYPASSES HEAT TREAT— A bar steel (Rc 32) that has a tensile strength of 150,000 psi is said to eliminate the need for heat treatment. It machines well, retains a good finish, and can be roll threaded. LaSalle Steel Co., Chicago, calls the material e.t.d. 150.



Front follower blocks, used in freight car coupler and draft gear mechanisms, are cast 16 at a time. Gates are burned off, and parts are ready for final finishing when they are broken from knock-off risers

Cast Steel Components Benefit Fabricator, User

Multiple molds reduce foundry costs; little or no machining is required; products are said to have added sales appeal, strength, and wear resistance

MAKERS AND USERS can gain by designing components as steel castings, says the Steel Founders' Society of America, Cleveland.

In the society's annual product development competition, founders and fabricators told how they held down production costs, boosted operating efficiency, or increased strength and wear life of parts by properly applying steel castings.

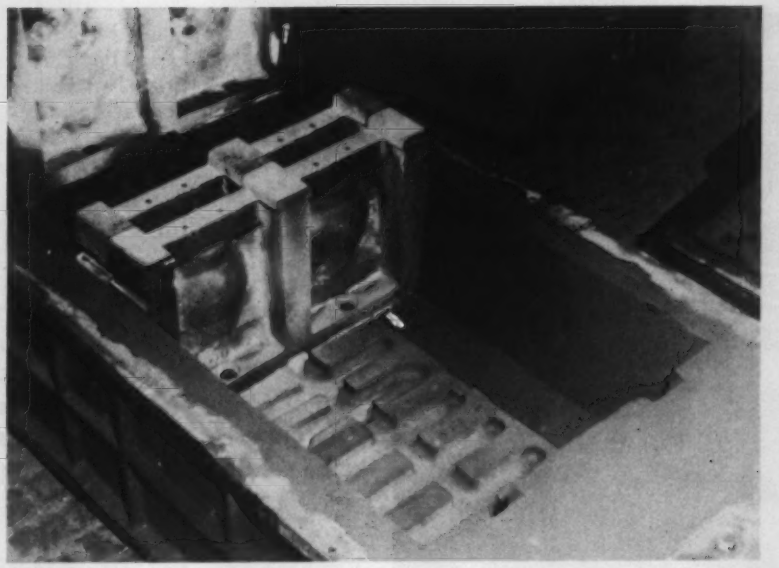
• Redesign of a freight car draft mechanism and efficient foundry practices made cast components more competitive.

The new design, which has been adopted by the American Association of Railroads as an alternate standard, is expected to become standard after a period of in-service testing. It includes an F-type coupler and a follower block with one concave surface.

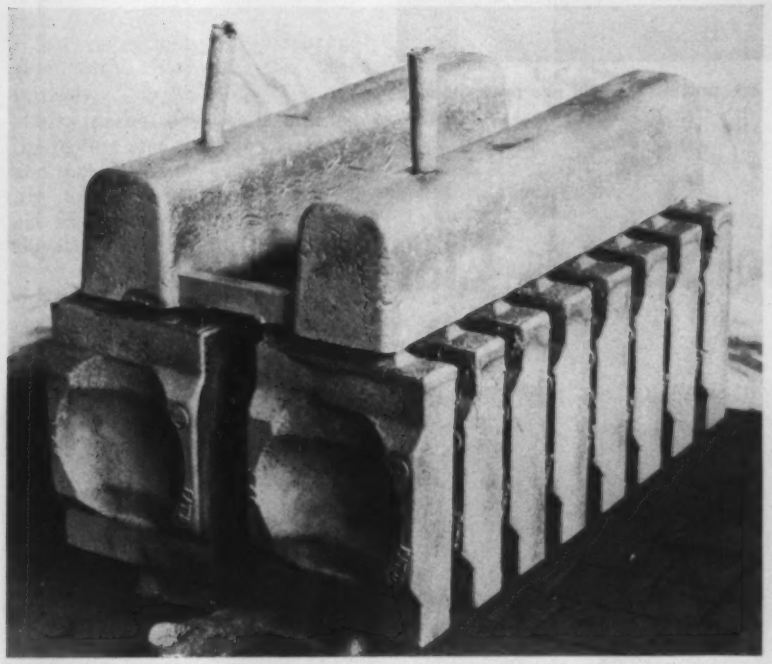
Previously, the follower blocks were flat and were fabricated from rolled steel stock. But the contours required on the new part would have made machining costs prohibitive.

Production costs were also high in the first foundry attempts to make the blocks with conventional molding methods, but Buckeye Steel Castings Co., Columbus, Ohio, was determined to reduce costs on the parts because of the potentially heavy tonnage involved. (Two of the blocks, each weighing 72 lb, are used on each car.)

The answer: A mold with eight main forming cores. It permitted 16 of the parts to be cast in one operation. That approach (and investment in appropriate pattern



Multiple mold is made by placing main forming cores in the drag, on the gate cores. Later, cores for knock-off heads are added, and the cope is set in position



Completed casting includes knock-off heads (top) and pouring gates (bottom). A minimum of machining is required after heads and gates are removed

equipment) gave castings a 34 per cent cost advantage over competitive production methods, the company reports.

• A manufacturer chose castings to cut production costs and improve the sales appeal of his product.

The possibility of using steel castings for wheel supports on a large bush cutter and mowing machine intrigued management at Specialty Mfg. Co., Houston. A casting design engineer from Texas Foundries Inc., Lufkin, Tex., suggested using the same streamlined casting for right and left supports, to save on production and stocking costs. An inexpensive wheel spindle, welded to the casting, would complete the basic part; position of two support ears, welded on later, would determine whether the completed part was for the right or left side of the machine.

Casting the part as a cored, tubular section saved weight, insured high strength, and improved overall appearance of the mower.

• A Southern building contractor wanted to save time on pile driving operations. He got help from a local steel foundry.

A pile follower designed and produced by Dilbert, Bancroft & Ross Co. Ltd., New Orleans, for Gurtler Hebert & Co. Inc., New Orleans, puts timber piles about 1½ ft underground. And it leaves an open area that serves as a mold for the pouring of a concrete cap.

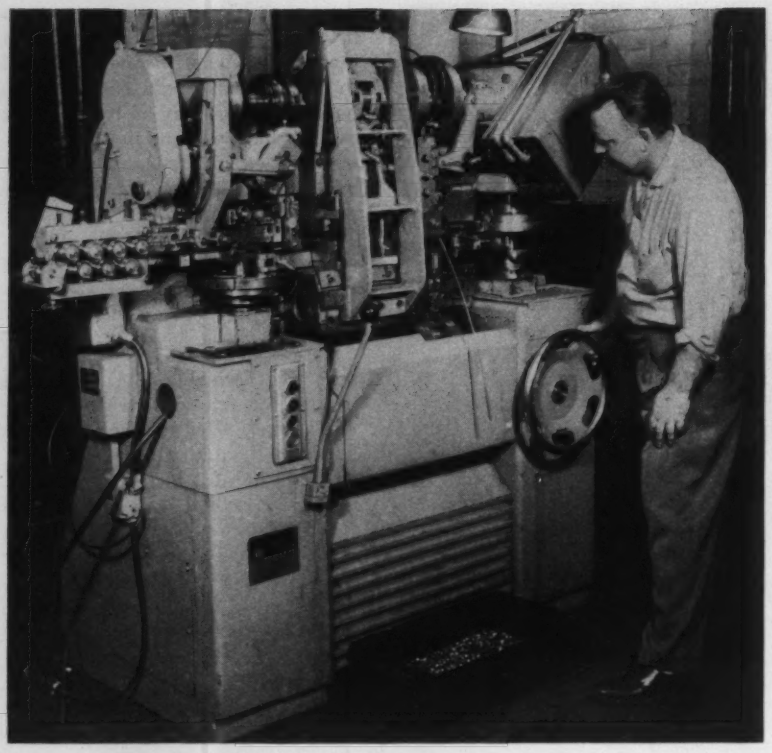
Previously, the pile was driven until the follower touched the ground. Then a stub pile was placed on top of the permanent timber so it could be driven to the required depth. The contractor says redesign of the pile follower cut driving time in half.

• Conversion to steel castings often makes parts wear longer, or increases resistance to breakage.

Blades in air separation equipment used at the Los Angeles plant of Sierra Talc & Clay Co. were turning in a service life of 10 to 12 months. Blades redesigned as castings by Alloy Steel & Metals Co. promise a life of 24 to 36 months. Over-all costs are comparable for the cast blades and the parts previously used. And castings can be made of a more wear resistant material, says a Sierra Talc & Clay official.

Use of a composite hopper (steel plates welded to castings) reduces maintenance expense and cuts downtime for repairs on a jaw crusher made by Alloy Steel & Metals. The material used previously couldn't stand the abuse from big boulders that were loaded into the hoppers from dump trucks.

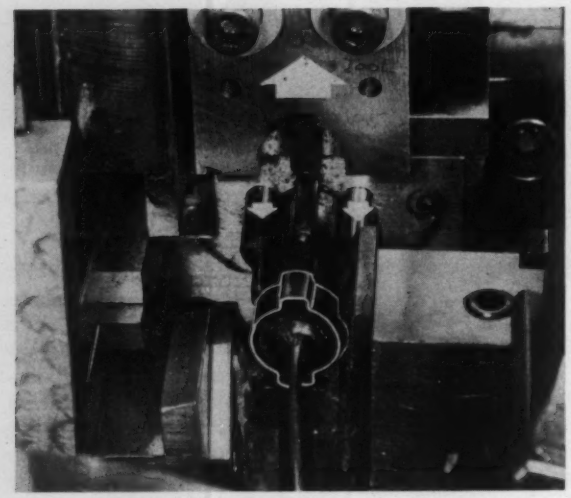
Initial cost of the redesigned hopper is lower than for the part it replaces. It is also said to be easier to repair.



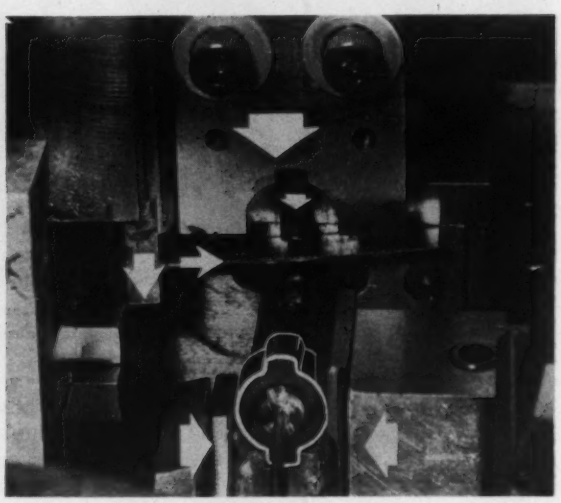
Stock for Cuyahoga's clamps is fed from left, passing through two press stations on way to forming and welding

Partmaker cites accessibility, ease of maintenance as major factors in cutting costs of formed and welded hose clamps. Flexibility is also an aid in smooth, fast change-overs, the firm claims

Vertical 4 Slide Speeds Clamp Output



Clamp formed in previous cycle has been pushed to the outer end of stationary center form by two knockout pins. Top forming tool has been withdrawn. New clamp is ready for welding. Guide rod leads to tote bin



Knockout pins withdrawn, strip moves to position over center form as stock clamp moves down. Cutoff tool cuts strip just before forming tool descends to form the upper half over center form

PROBLEM: **Find a way to cut costs on a new line of low profit hose clamps for autos, appliances, and similar assemblies.**

SOLUTION: **A vertical four slide forming machine which requires 25 per cent less setup time than older models.**

"The over-all saving in setup labor and increased operating time is substantial," says John L. Moran, vice president in charge of manufacturing, Cuyahoga Products Corp., Cleveland. "Changes of all tooling are frequent since we make 28 sizes and types of welded and mechanical clamps."

His opinions are backed by more than eight months of experience with the machine. (It's built by Torrington Mfg. Co., Torrington, Conn.) Here are some additional advantages Mr. Moran lists:

1. Production is 50 per cent faster than that of alternate methods.
2. Feed accuracy, an important factor is quality, is consistently closer than 0.001 in.
3. Forming tools are interchangeable with those on the other verticals.

Mr. Moran also points out that the tooling area is readily accessible and that the center form (key forming tool) is extremely rigid—an aid in hammering the tab on the Cuyahoga mechanical lock design.

● **Background: Production engineering needed a machine that would produce the various styles and sizes of clamps with precision. Capacity also had to be expandable to keep pace with predicted growth. Flexibility was necessary to enable rapid shifts from one size to another.**

Easy accessibility and maintainability of tools have been important factors in the success of the vertical machine.

"Breakdowns are sudden and frequent in this business. The slightest deviation in wire or strip stock usually means broken tools," one engineer told STEEL. "Features which save even a fraction of a minute in setup time are extremely valuable."

● **The forming machines use SAE 1010 strip about 0.030 in. thick and ¼ to ⅜ in. wide to make two types of clamps in several sizes.**

Each hose clamp has one or more U-shaped lugs which are secured to nipples during installation by pinching each lug with a standard lug tool.

Types made on the four slide machines are either a mechanical lock (for 100 psi service) or a welded, heavy duty type (for higher pressures) in diameters below 1.36 in.

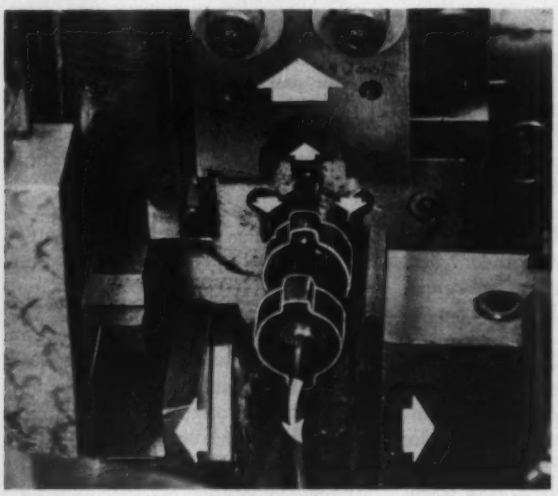
The mechanical style is made in the forming area of the machine by folding a tab in one end of the formed strip through a slot in the other end. Tab and slot are stamped out of the strip material as it is fed through the first press station.

The vertical machine can be switched from the mechanical to the welded type by changing the tooling in the forming area and in the press section. Welding apparatus is placed aside for the mechanical lock clamp.

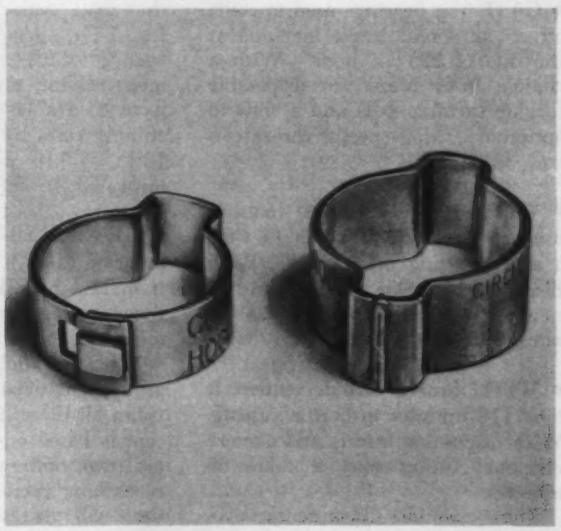
The welded clamp is completed by joining the strip material at the center of one lug rather than the mechanical tab fold. Tests show that the strength of the welded joint greatly exceeds the practical requirements.

Both forming and welding are done automatically in the vertical forming area (see illustrations below). Welding electrodes are positioned and the timing adjusted to permit forming and welding on the same stroke.

Welding equipment is isolated from the forming plane and can be adjusted independently of other tooling. Older machines combined welding and forming tools, causing interference. The separation of the two permits welding during more than 300 degrees of the cycle time—two or three times longer than that previously available. Weld quality is said to be much improved with lower power consumption, increased electrode life, and better tool protection from welding flash.

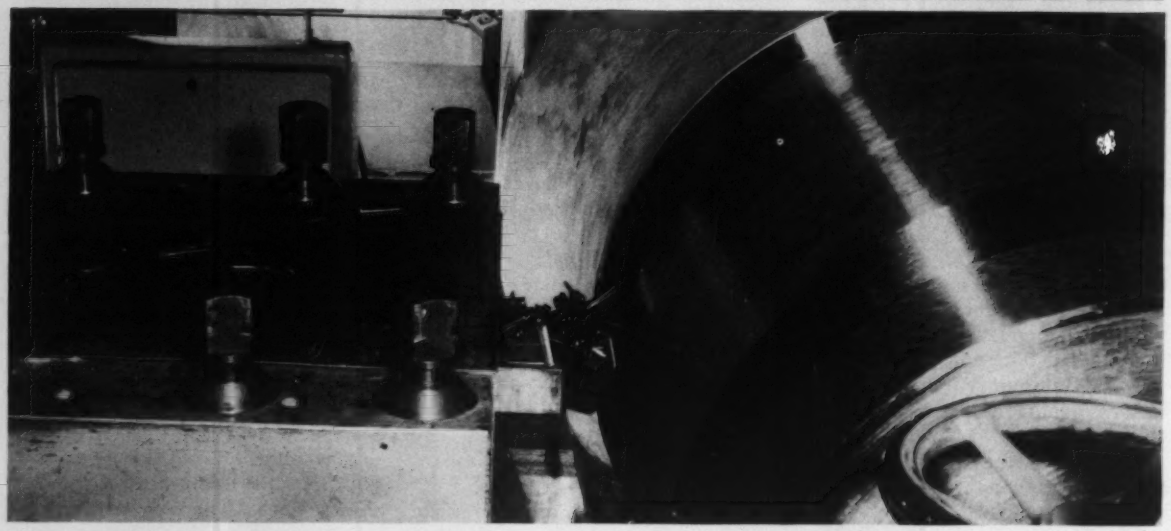


Top, side, and bottom tools have just formed strip. Weld completed on the near piece, clamps retract, allowing knockout pins to push newly formed part into position, dislodging welded clamp onto guide rod



Mechanical clamp is for lower pressures; welded clamp handles higher pressures. They're made on same press

H. F. DeLong, general manager, GE's Metallurgical Products Dept.: "We believe Hi-E, if fully utilized, could be applicable to $40 billion to $50 billion of metalworking industry costs. We don't assume that Hi-E could save all of the billions being wasted . . . but results to date indicate we can make a substantial contribution to cost improvement."



Are these cutting tools running too slow? Too fast? Figuring the most efficient speed can be a job, but GE engineers are promoting a system they feel will do it for you, and it takes only a few minutes

GE Offers Machining Profit Finder

• CAST iron bearings used to come off an automatic screw machine at the rate of 225 an hour. With a change from brazed to disposable carbide turning tools and a shift to optimum cutting speeds, the rate is now 353 parts.

• WITH high speed steel tools, it used to take 130 minutes to turn a shaft bearing on a lathe. With disposable carbide inserts and a newly calculated speed rate, the same job takes only 27 minutes.

• WITH brazed carbide cutters, it took 116 minutes to bore a casting. With disposable inserts and a more efficient cutting rate, it takes 66 minutes.

Those examples illustrate improvements production men in some 40 departments at General Electric Co. have achieved with a technique they call high efficiency machining. Dr. W. W. Gilbert, manager of GE's machining development service, says the departments have been able to reduce their machining costs by factors as large as 10:1. "Their savings can now be measured in millions."

• GE's new Hi-E (high efficiency) program takes a proved theory and it makes the calculations so simple they can be made in a matter of minutes.

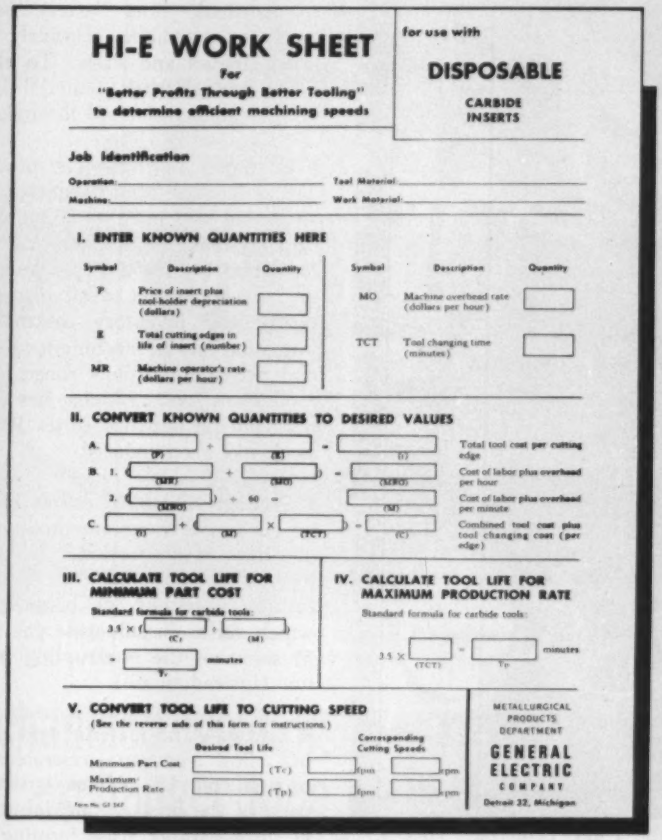
With the help of Dr. Gilbert's group, GE departments have been using Hi-E for five years. The concept is based on the fact that there are two optimum speeds for any machining operation: 1. The speed that will give the lowest cost per piece. 2. The higher speed that turns out the most pieces in a period of time. Efficient machining will always be at one or the other of these speeds, or in the range between them.

In practice, GE engineers have found that many jobs had been run at speeds that approach neither the best production nor the lowest unit cost.

Calculation of the two speeds is a simple, step-by-step process, but it always has taken so much time that production men were reluctant to do the figuring.

New method: Any production man, armed with a worksheet and a pocket calculator, can calculate the efficient range in, say, 10 minutes. Both the worksheets and the calculators will be furnished to customers by GE.

• Although the final answer translates into cutting speed and machine revolutions per minute, the key in-



HI-E WORK SHEET
For
"Better Profits Through Better Tooling"
to determine efficient machining speeds

for use with
DISPOSABLE
CARBIDE
INSERTS

Job Identification

Operation: _____ Tool Material: _____
Machine: _____ Work Material: _____

I. ENTER KNOWN QUANTITIES HERE

Symbol	Description	Quantity	Symbol	Description	Quantity
P	Price of insert plus tool-holder depreciation (dollars)		MO	Machine overhead rate (dollars per hour)	
E	Total cutting edges in life of insert (number)		TCT	Tool changing time (minutes)	
MR	Machine operator's rate (dollars per hour)				

II. CONVERT KNOWN QUANTITIES TO DESIRED VALUES

A. (P) ÷ (E) = (I) — Total tool cost per cutting edge
B. 1. (MR) + (MO) = (MRO) — Cost of labor plus overhead per hour
2. (MRO) ÷ 60 = (M) — Cost of labor plus overhead per minute
C. (I) + (M) × (TCT) = (C) — Combined tool cost plus tool changing cost (per edge)

III. CALCULATE TOOL LIFE FOR MINIMUM PART COST

Standard formula for carbide tools:
3.5 × (C) ÷ (M)
= Tc minutes

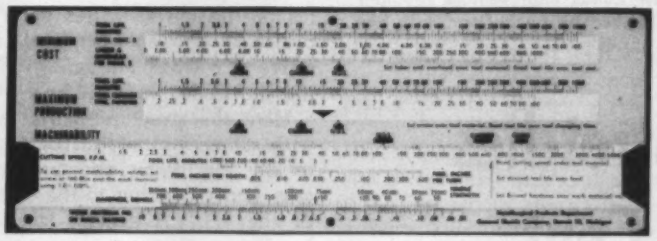
IV. CALCULATE TOOL LIFE FOR MAXIMUM PRODUCTION RATE

Standard formula for carbide tools:
3.5 × (TCT) = Tp minutes

V. CONVERT TOOL LIFE TO CUTTING SPEED
(See the reverse side of this form for instructions.)

	Desired Tool Life	Corresponding Cutting Speeds	
Minimum Part Cost	(Tc)	fpm	rpm
Maximum Production Rate	(Tp)	fpm	rpm

METALLURGICAL PRODUCTS DEPARTMENT
GENERAL ELECTRIC COMPANY
Detroit 32, Michigan



These are the two fundamental devices used to figure optimum machining rates. The worksheet (at top) is used to organize the information you'll need, such as tool and overhead costs and tool change time. The pocket calculator (bottom) does the figuring for you. The system works for single or multiple point cutters, brazed or disposable types

gredient in machining efficiency is tool life.

As cutting speed rises, nonproductive costs per piece (such as loading and traverse) remain constant. Machining costs (labor and overhead) drop. But tool cost (including the cost of tool change) soars, offsetting other cost gains. (The importance of tool change costs accounts for the emphasis placed on disposable inserts.)

Tool life also becomes the villain in production. At higher speeds, the time needed to change short-lived tools cancels gains made in machining rates.

Henry F. DeLong, general manager, Metallurgical Products Dept. (Detroit), adds: "It is traditional that tools are valuable—to be conserved with care. The attitude was strengthened as more expensive tooling, such as high speed steel, cemented carbides, and cemented oxides, emerged. The idea that tools are expendable and are used to buy time comes as something of a shock."

Mr. DeLong says: Although the U. S. manufacturer can't afford much time to complete an operation, "we can afford the tools to save that time. Accordingly, we have developed in Hi-E a workable plan which can be used in almost any metal cutting shop to save more of the time and to find the balance between time cost and tool cost which will provide the lowest ultimate product cost."

• The Hi-E concept has been turned into a customer service package.

Convinced that the sound approach to machining efficiency can help nearly all their customers, the Metallurgical Products Dept. is readying its more than 30 salesmen in six districts (plus nine application engineers) to show customers what the concept is, how it works, and to give them the implements they'll need to use it.

Each customer session will start with a short slide film, "The Chips Are Down," that dramatizes the problem of machining inefficiency and shows how it can be corrected. The film is for management.

That session will be followed by one for production and methods engineers. (The program takes less than a full day per group.) The students will see a second color slide film, learn what Hi-E is all about, get their worksheets and calculators, and practice problem solving. GE engineers expect that much of the practice calculating will be done on jobs the customer is running.

GE spokesmen admit that the Hi-E program is a crusade for efficiency and a marketing program. One says: "We know that if we can provide a real customer service, it will be translated into more cutting tool sales for us in the future. Hi-E is a simple way for customers to help themselves, but we're not overlooking that it can pay off for us too."

In contrast to earlier practice, Westinghouse now builds high voltage breakers on a five station line. Units up to 22 tons are moved by an in-floor drag line

U-Shaped Line Stretches Capacity 50 Per Cent

Changing from job shop techniques to progressive in-line production of power circuit breakers also reduces manufacturing time at Westinghouse

USE OF three dimensional layout techniques to arrange internal flow, storage of materials, and location of machine tools has paid off several ways at the Circuit Breaker Dept., Westinghouse Electric Corp., Trafford, Pa.

1. Capacity has been boosted 50 per cent without increasing floor area.

2. Manufacturing cycle time has been greatly reduced (80 per cent in one line of circuit breakers).

3. With faster processing and computer control, inventory requirements are 15 to 20 per cent less than they were, and delivery time has been reduced.

Multistation lines are used in the new, 370,000 sq ft plant. Circuit breakers and major components are progressively assembled. In many cases, the approach is also followed for testing and production. The conveyorized lines accommodate parts and assemblies of widely differing shapes and sizes. To eliminate manual work, material handling equipment is used throughout.

● **Computer Control**—The production system has been completely revised and converted to a punched card system. Manufacturing information is computer processed to give weekly access to all manufacturing and inventory control information and to machine load data and production follow sheets. The production cost system has also been put on punched cards. Paperwork has been reduced.

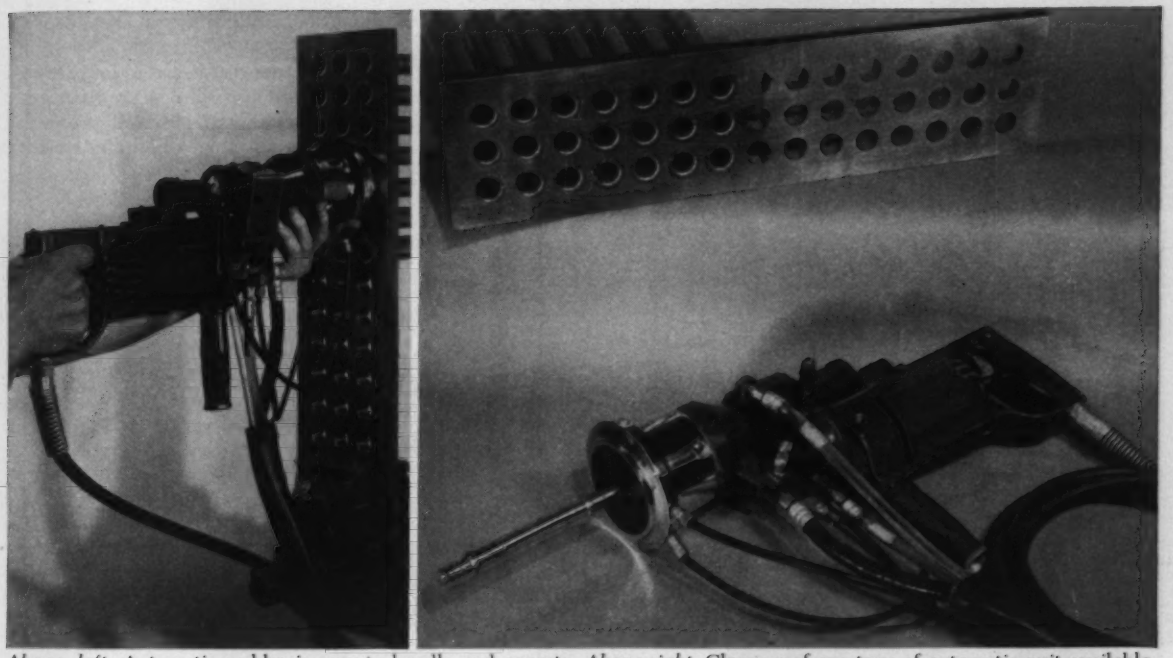
● **Product**—Oil filled circuit breakers (floor and frame mounted types) are now in production. In planning, it was essential to provide for future production of breakers in which sulfur hexafluoride gas (SF-6) serves as the interrupting medium (instead of oil).

● **Layout**—The material and product flow pattern resembles a squared off U. Major structural parts of the breakers are fabricated in three parallel aisles forming one leg of the letter. After parts are processed into subassemblies, they arrive at a crossplant railway, linking the feeder and assembly areas.

Here the structural parts merge with subassemblies and parts made in the machining and production area (corresponding to the crossbar of the U). A general storeroom handling all incoming materials (except bulk steel) supplies the machining and production area. Operations concentrated here are welding, machining, brazing, heat treating, polishing, and related work.

Components made in the two main feeder areas are transferred to three breaker assembly aisles paralleling each other to form the downward leg. Integrated in this area are less extensive assembly lines for major subassemblies.

In sequence, operations in these breaker assembly aisles follow this pattern: Assemble, test, paint, and ship. Finished products are delivered ready for shipment at truck and rail docks only a few feet from the point where incoming bulk steel is received.



Above, left: Automatic welder is easy to handle and operate. *Above right:* Close-up of one type of automatic unit available for welding tubes to tube sheets. Note uniformity of sample welds above.

Mechanized welding process makes the permanently tight heat exchanger tube joints needed in modern power plants

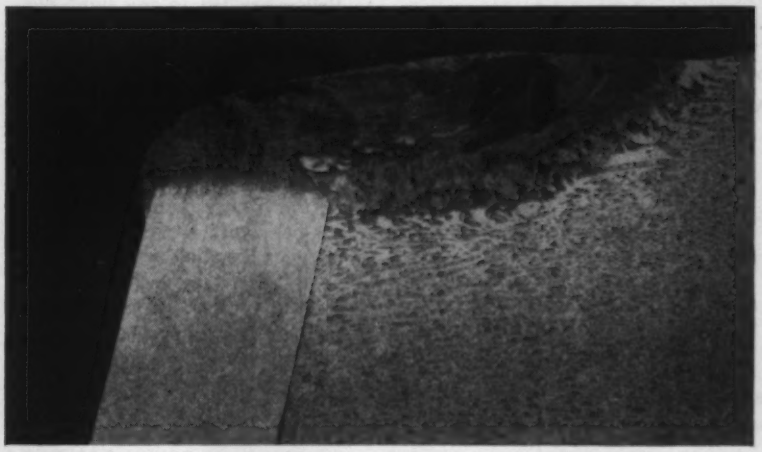
The design and operation of modern steam power plants require that tubes in condensers and feed-water heaters be installed permanently tight to prevent contamination of the boiler water.

Welding the tubes to the tube sheets will insure this. In most cases, however, welding cannot be done manually for a variety of reasons. A mechanized process must be employed to produce consistently high quality joints.

Inert-gas tungsten-arc (TIG) welding has the advantages of simplicity, good control, and protective shielding without the use of flux. Tough, dependable equipment for automatic welding with this process—such as that shown in the illustrations above—is widely available. These units make it possible to weld, without the complication of filler-metal addition, most of the tube and tube sheet combinations employed in condensers and heat exchangers.

Joints, whether a few hundred or several thousand in number, are uniform in geometry and quality. Typical are the results obtained with tubes of Arsenical Admiralty-439 on tube sheets of Naval Brass-450, as shown in the 20X micrograph reproduced at the left, below.

Technical Assistance: The Metallurgical Department of The American Brass Company will gladly help you in the selection of suitable alloys and in welding procedures and the design of joints. This service is available without obligation. See your American Brass representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.



Micrograph 20X of typical weld section. Tube is of Arsenical Admiralty-439 and tube sheet is of Naval Brass-450.

ANACONDA®

TUBES and PLATES for

CONDENSERS and HEAT EXCHANGERS

Made by The American Brass Company

Co-ordinated cable hoists lower the folding scaffold into the throat of the blast furnace. Turnbuckles on the cables permit the platform to be leveled

Folding Scaffold Is Used In Blast Furnace Overhaul

It carries up to 30 workmen into the stack for lining removal and shell inspection; it also serves as a working surface for bricklayers relining the furnace

RELINING of blast furnace stacks at the Sparrows Point (Md.) plant, Bethlehem Steel Co., is faster and safer, thanks to folding, swinging scaffolds.

They were developed at the plant.

The scaffolds consist of hinged steel platforms with several types of extendable arms, which can be adjusted to conform to stack diameter. Wooden decking is fastened to the arms, providing a uniform working surface over the entire area.

• The platform is lowered into the blast furnace throat for lining removal and shell inspection.

The scaffold (in its folded position) is lowered into the top of the stack after the furnace has cooled and top castings have been removed.

The platform is supported by a hoist frame, bolted to the tunnelhead casting. Lift is provided by a 15 hp motor connected to four hoists by driveshafts and gear reducers. Turnbuckles are provided on each cable for leveling. Four independent, auxiliary steel cables are used as safety lines.

Up to 30 men can ride the scaffold, removing bricks and wear irons. At the same time, the stack shell is inspected. If a defect is found, staging brackets are welded to the shell at that spot so a tight scaffold can be erected for repairs. While shell repairs are being made, lining removal continues at a lower level.

The lining is removed with pneumatic tools, supplied with air by a 3 in. hose connected to a manifold on the platform. Workmen drop lining debris to the hearth between the edge of the scaffold and the remaining brickwork.

• When stack cutting is completed, the swinging scaffold is raised to the top of the stack. Later, it is used for rebricking.

Before rebricking starts, a tight scaffold for brick handling is built at the third bosh band from the mantle. The platform is then lowered and outfitted for the bricklayers. Communication between the two levels is maintained by a telephone and buzzer system.

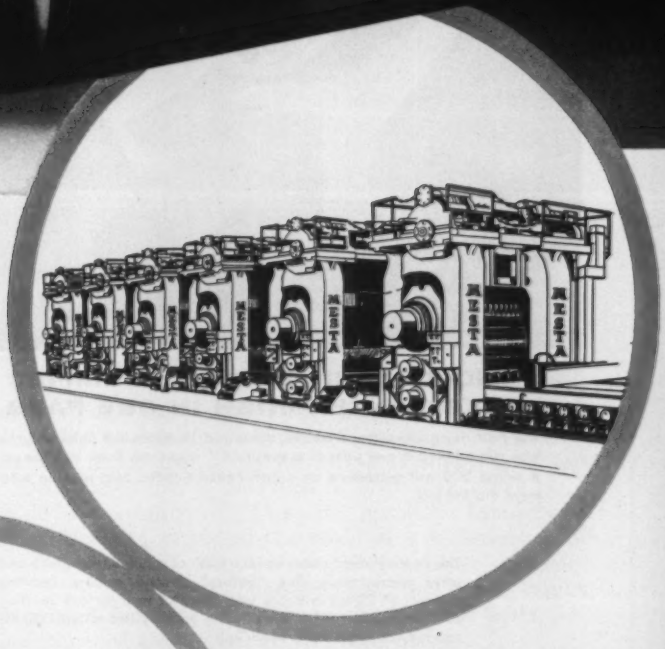
A 7/8 in. diameter wire rope is used as a sweep-center during the stack reline. It is fastened to the tight scaffold at the center of the mantle, and secured at the top to the hoist frame on the center of the tunnelhead ring.

Bricks are fed to the tight platform on roller lines and hoisted to the swinging scaffold in steel mesh slings by a 2500 lb, 300 fpm hoist on the tunnelhead, operated from the swinging scaffold by pushbutton pendant controls. Fireclay mortar for bricklaying is pumped to the platform from ground level.

As brickwork progresses, a safety scaffold is installed across the stack opening, 13 ft above the tight platform, to protect workers below. Holes in the safety scaffold and swinging platform allow brick slings to pass through.

When the brickwork reaches the top of the stack and the scaffold is no longer needed, it is folded and removed from the furnace.

MESTA ROLLS



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PITTSBURGH, PENNSYLVANIA

NOW! Microstoning Provides Controlled/Micro-Inch Surface Finishing In Minutes!

The Taft-Peirce/Supfina Microstoning System has given Metalworking a whole new technique for producing truly superior surface finishes at low cost.

The key is the Supfina Attachments. They can generate a controlled micro-inch finish of whatever degree desired, all the way to a 0.5 micro-inch mirror finish, plus geometric correction . . . in a matter of minutes!

This Microstoning process presents a large abrasive contact surface to the work at low constant pressure, oscillating at up to 3000 strokes per minute, for gentle removal of surface imperfections without heat generation. The job is done quickly, with a surface speed of 20 to 130 ft/minute for roughing and 400 ft/minute for finishing, using one or more stones of required grit that require no dressing.

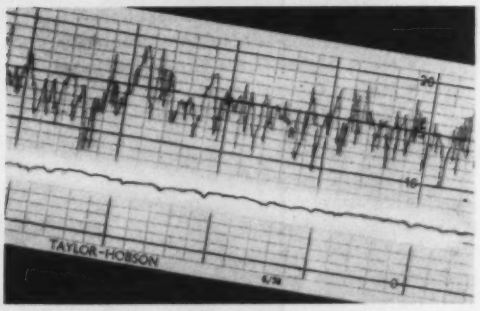
Taft-Peirce/Supfina is versatile, too. The Attachments can be easily mounted on tool posts of lathes, boring mills, planers or on heads of cylindrical grinders.

Microstoning offers so many quality improvement and cost saving opportunities that you should get complete details at once. Demonstrations on your parts can be arranged at the Taft-Peirce Finishing Laboratory. The demand is high so please send your request in early. Call or write for complete information, now.

MICROSTONING MEETS SPECIFIED MICRO-INCH FINISH IN ONE PASS

The part being microstoned above, averaged 16 micro-inch finish as ground, was microstoned in one pass to a specified 7 micro-inch finish in 30 seconds. A single 500 grit microstone on a Taft-Peirce/Supfina Microstoning Attachment did the job.

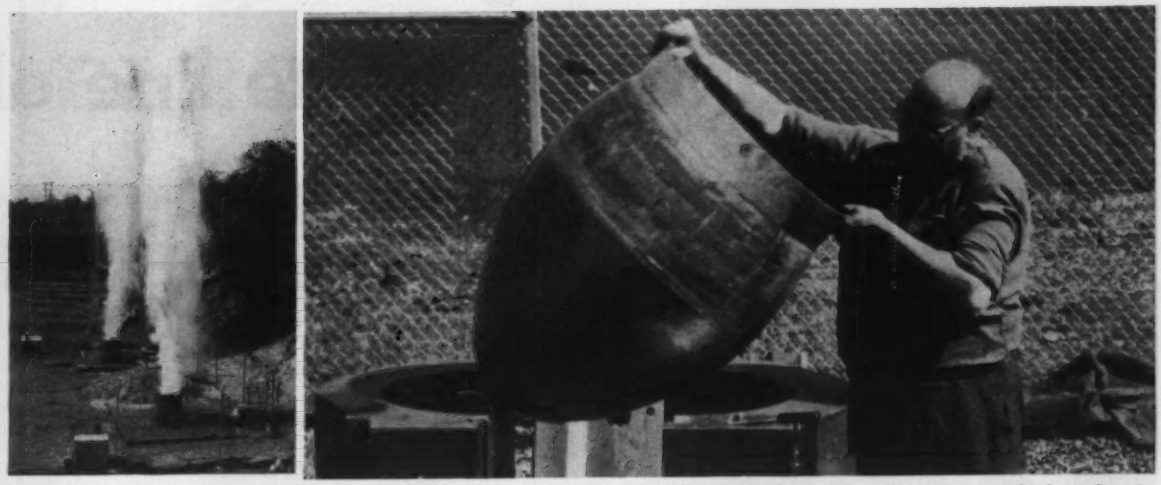
This Talysurf chart shows surface finish of a guide pin before and after Microstoning. The "before" ground surface reading (above) of 20 micro-inches was changed to a surface reading of 1.5 micro-inches by Microstoning for only one minute! (Chart courtesy of Engis Equipment Co.)



Finish it with TAFT-PEIRCE SUPFINA

TAFT-PEIRCE MANUFACTURING CO., 25 MECHANIC AVENUE, WOONSOCKET 1, RHODE ISLAND

Explosives Size Missile Warhead



Inner and outer shells are formed at the same time. Blast forces geysers high in the air. Operator (right) removes an outer warhead shell

Problems involved in the shaping of large parts can be easily overcome with the method, says Dana Corp. division. It bypasses need for larger forming equipment

EXPLOSIVES make the forming and sizing of a large missile warhead from 6061-T6 aluminum alloy comparatively easy, says H. B. Bartlett, vice president and general manager, Parish Pressed Steel Div., Dana Corp., Reading, Pa.

"Forming rates are far beyond those obtained on our regular equipment. Springback and work hardening can be kept to a minimum. The method is definitely applicable to those cases which are impossible for more conventional methods," states Mr. Bartlett.

• Forming takes place in 0.001 second. Production is four parts an hour.

Parish employs a split die equipped with vacuum, seals, and an open top. Water serves as a transmitting medium for Primacord explosive.

The warhead has an inner and an outer shell. Experience showed that the aluminum alloy warped during treatment and that it was difficult to hold dimensions without some type of reforming which wouldn't rupture the metal.

"After some preliminary research with Hercules Powder Co., we decided to finish size the warhead with explosives," explains Mr. Bartlett. Maximum expansion, forming pressure, quantity, type and location of explosive were approximated accurately enough for prototype operations.

After firing, the outside shape and surface finish of the warhead are close to the same size and shape as the female die cavity. Parish uses spun preforms which have a fairly rough surface (about like a 1/4 in. screw thread).

• Open die, high energy forming must be done in noncongested areas to meet government regulations.

The firing area is enclosed with a heavy wire mesh fence. It's next to a high hill in a railroad marshaling yard. Magazines and the detonating shed are more than 100 ft from the dies.

Noise is not nearly as loud as some people expect. The report is compared to that of a 12 gage shotgun.

• Work is done by shock waves and pressure. Here are some general facts Parish has checked.

Shock waves must be transmitted through some medium to gain maximum benefit. Like most firms, Parish uses water because it's simple and cheap.

When a charge is detonated, it can develop pressures of 1 million psi for extremely short periods.

Prior to forming, the joint between the blank and die must be sealed and the space evacuated; otherwise, trapped air will cause bulging and welding between part and die metal. (Entrapped air can be raised to 3000° F that way.)

Dies are normally female and can be made of a wide variety of materials. Tool steel is generally considered best, but good results have been reported with softer materials, including plastics.

Parish prefers steel or plastics because they impart a smooth finish to the warheads. Surface finish and cleanliness of the die are the most important factors in producing acceptable pieces. Die size and mass must be adequate to withstand the high pressures to maintain accuracy.

"Now get immediate
of complete line of

A. T. Gallagher, Manufacturing Superintendent, Delroyd Worm Gearing.

"Here's a shot of our Delroyd Verso worm gear — one of hundreds being boxed and made ready for shipment. Unlike most speed reducers, this Verso unit can be mounted in any position — horizontal, vertical, upside down. • "This is but one model in a complete line of Delroyd worm gear reducers — with the widest range of horsepowers and sizes in the industry."*

*1⅛" center distance, fractional horsepowers — to 12" center distance, 152 horsepower. Reducers to 36" center distance with horsepower capacities to 700 are supplied as standard. Larger units to meet any requirement can be supplied on special orders.

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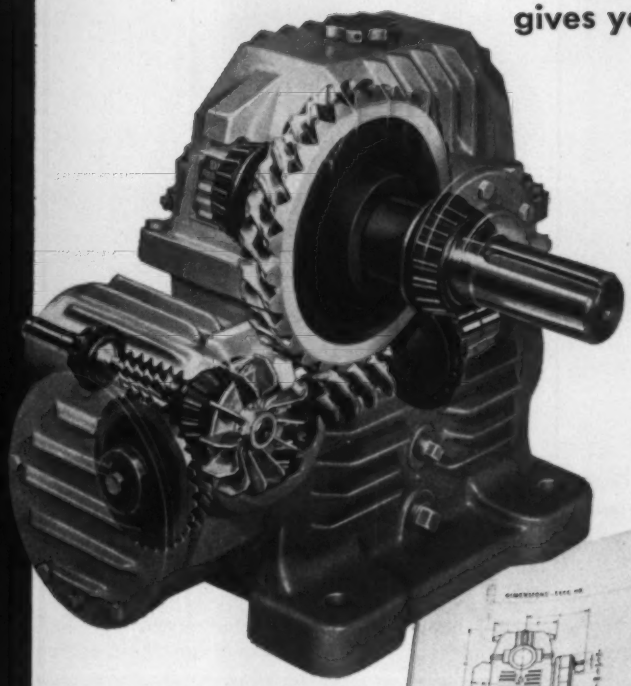
DELROYD worm gearing

gives you these superior design features:



- Exclusive involute helicoid thread form for highest load capacities
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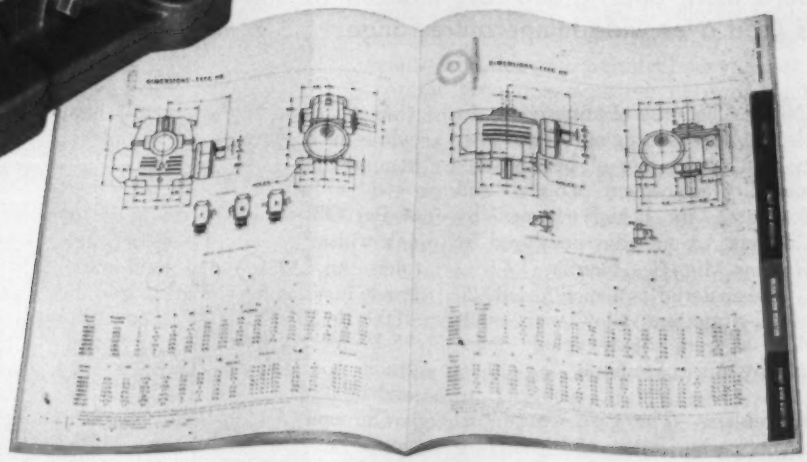

Now available — the worm gear industry's newest, most complete catalog. Contains all basic design and application data, selection charts, ratings and service factors — plus illustrations in full color. For your free copy, write on your company letterhead to: Delroyd Worm Gearing, De Laval Steam Turbine Company, Trenton, New Jersey.

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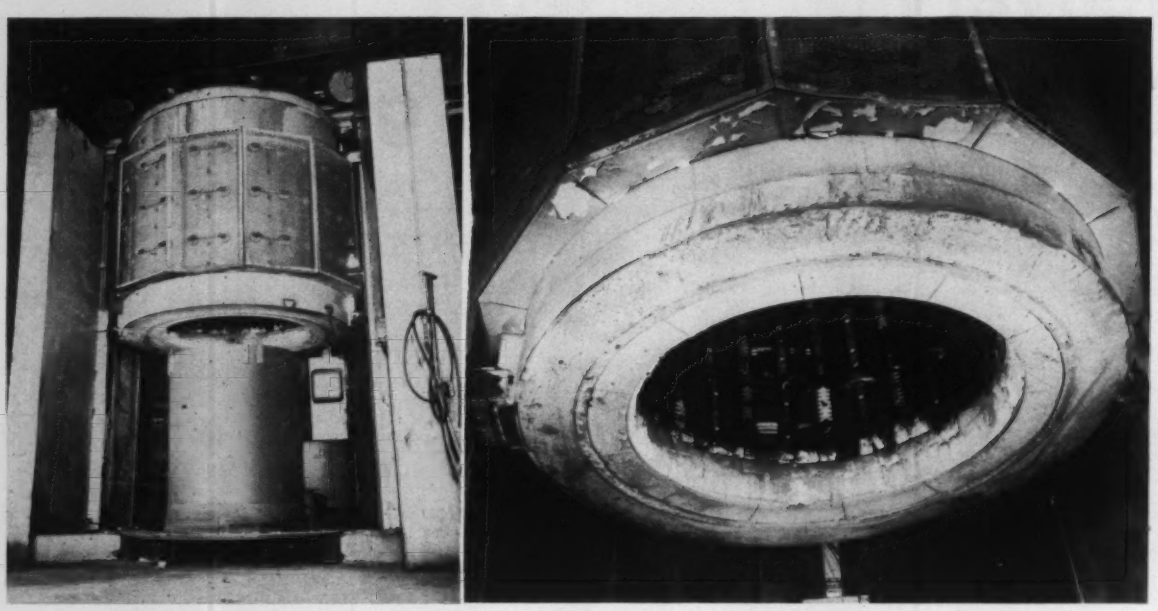
Alloy Boosts Heating Element's Life



The conventional bell type furnace (left) in raised position permits examination of exposed heating elements (right)

Modified 80-20 nickel-chromium alloy resists corrosion, carburization, and "green rot" induced by furnaces gases. It is used over wide temperature range

INCREASED use of atmospheres in electric heat treating operations lowers the service life of heating elements. Replacement costs and downtime are being trimmed by Chromel AA, an alloy developed by Hoskins Mfg. Co., Detroit.

The material is a modified 80-20 nickel-chromium alloy with additions of iron, silicon, cobalt, manganese, and columbium.

• **Problems**—The gases cause corrosion, carburization, and intergranular oxidation of the chromium ("green rot"), which often affects heating elements alloys at 1500 to 1800° F.

• **Tests**—In a long series of tests, sample strips were subjected to various atmospheres. Temperatures were maintained at a uniform rate during warmup to 2200° F for periods of 2 to 84 hours. The power was then turned off and the atmosphere changed to argon for about 1 hour while the furnace cooled to ambient temperature.

• **Pay Off**—Standard grades do the job within prescribed limits. Example: An 80-20 nickel-chromium grade is suited for applications in the 1800 to 2150° F range; a special 35-20 nickel-chromium-iron composition operates well between 1500 and 1800° F.

Chromel AA operates over the entire range of temperatures. Forbes S. Sibley, project engineer, Metallurgical Research & Development Dept., says tests show it has improved resistance to carbon pickup and to corrosion; it is resistant to sulfur, chlorine, and other contaminants; and it is not susceptible to "green rot."

• **Usership**—Hevi-Duty Electric Co., Milwaukee, reports that it has been using Chromel AA in these applications: In temperature ranges where Chromel A does not normally operate (2000 to 2200° F); where resistance to carburization is required; or where sulfur or other contaminants are present.

Another firm reports: In ladle covers for aluminum holding furnaces, the alloy's resistance to chlorine bearing atmosphere at 1725 to 1800° F resulted in three to five times the life of standard elements.

Exposed to a carburizing atmosphere, it was still operating satisfactorily after five months of operation. And when tested in an atmosphere conducive to "green rot" corrosion, the element showed no sign of deterioration after four months of service.

Have you entered the

Usership Contest?

See the Servicenter, Pages 5 and 6.

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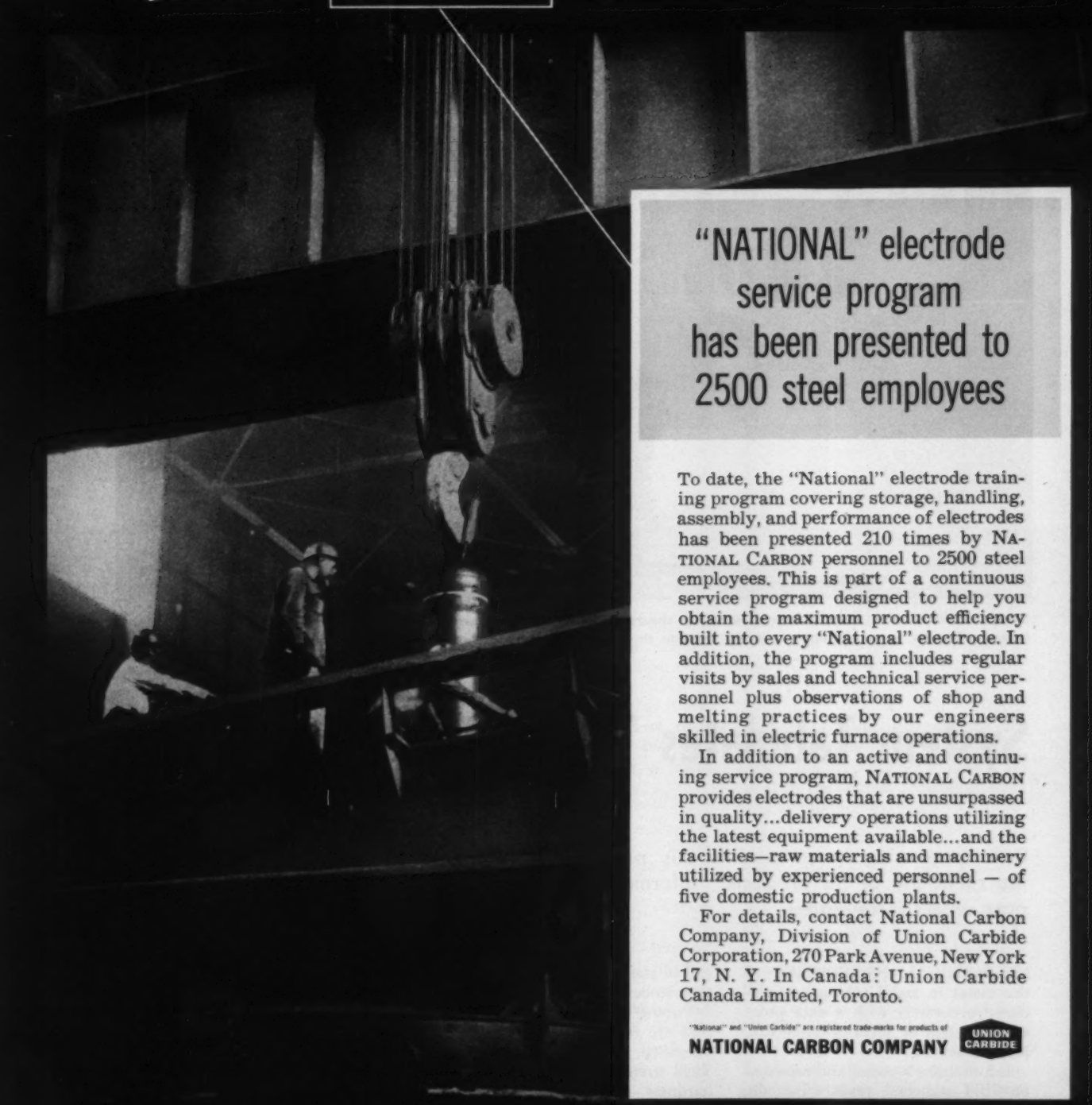
QUALITY | SERVICE | DELIVERY · FACILITIES!



"NATIONAL" electrode service program has been presented to 2500 steel employees

To date, the "National" electrode training program covering storage, handling, assembly, and performance of electrodes has been presented 210 times by NATIONAL CARBON personnel to 2500 steel employees. This is part of a continuous service program designed to help you obtain the maximum product efficiency built into every "National" electrode. In addition, the program includes regular visits by sales and technical service personnel plus observations of shop and melting practices by our engineers skilled in electric furnace operations.

In addition to an active and continuing service program, NATIONAL CARBON provides electrodes that are unsurpassed in quality...delivery operations utilizing the latest equipment available...and the facilities—raw materials and machinery utilized by experienced personnel — of five domestic production plants.

For details, contact National Carbon Company, Division of Union Carbide Corporation, 270 Park Avenue, New York 17, N. Y. In Canada: Union Carbide Canada Limited, Toronto.

"National" and "Union Carbide" are registered trade-marks for products of

NATIONAL CARBON COMPANY

UNION CARBIDE

Study of data taken from property summary sheets for past orders (inset) will help insure reliability in small tubing passing through the vacuum annealing furnace above

System Tabulates Tubing Properties

Data processing setup permits this producer to improve the reliability of his products. Information acquired from past orders is reviewed

MECHANICAL PROPERTIES of the metal in small tubing are predicted accurately with a data processing system at Superior Tube Co., Norristown, Pa.

Information is coded and recorded on IBM punched cards. Periodic analysis of the data gives complete information on average and maximum-minimum mechanical properties for any type or size of tubing.

• The system provides quick recall of the company's tube drawing experience to upgrade production.

Tubing diameter and wall thickness are recorded. The material is identified, and its temper is noted. Yield strength, tensile strength, and hardness are tabulated. Surface roughness and depth of imperfections are recorded. The data sheet also shows carbon analysis and grain size.

Each IBM card indicates the specification a particular order of tubing meets. It indicates whether certified test reports are issued, gives the date of the test, and identifies the distributor, customer, and raw material source. Quality coding, order number, and heat number are also tabulated.

The system permits the company to determine the amount of acceptable tubing it can make to a given specification, so production costs can be calculated accurately.

• Tabulated data help the company establish or verify published specifications.

The system indicates whether a specification for small tubing can be met, which helps to eliminate un-

realistic orders. It also improves product reliability by revealing how closely specifications can be met.

The company's published tubing specifications are constantly verified. Summaries of properties are subjected to statistical analysis to determine or verify ranges of mechanical properties for publication and to calculate the percentage of tubing that doesn't conform to minimum and maximum requirements. Published properties are revised, if necessary, to agree with the data summaries.

• The data processing setup helps the user make the most practical and economical tubing selection, the company says.

The user must choose from an extremely large number of materials, tempers, tube forms, and dimensions to meet specifications for a particular application. Practical and technical knowledge narrows the range of choices. But Superior says its data system helps the user make the best choice.

Study of the cards indicates whether the type, size, and temper of tubing chosen by the user will conform to a given set of mechanical properties.

The company can determine production costs by calculating the percentage of tubing that won't meet specifications and suggest downgrading of the specification for greater economy, or upgrading it for better performance.

In one case, an aircraft engine manufacturer ordered Inconel X, annealed, seamless tubing, ½ in. OD, with a 0.035 in. wall thickness for fuel lines. Military specifications called for tensile strength to resist maximum stress of 135,000 psi, with a minimum elongation of 40 per cent in 2 in. The tabulating system showed that the specification could be met.

Another order called for Type 347 stainless steel, seamless tubing, ⅛ in. OD, with a 0.006 in. wall thickness. A minimum elongation of 40 per cent was specified. Statistical analysis indicated that 25 per cent of the tubing wouldn't meet those requirements. Later, the user found that 35 per cent elongation was sufficient for his product. The alternative: Increase wall thickness to 0.015 in. or more to meet the elongation requirement.

Electroplaters Seek Process Versatility, New Markets

DR. W. A. WESLEY
Newly elected president

PLATERS are moving in two directions to increase the versatility and use of their processes, it was learned at the annual meeting of the American Electroplaters Society Inc. in Los Angeles last week.

They are seeking new uses for cleaning, sheathing, and coating processes which depend upon the application of electric currents.

The electroplaters are also studying the service conditions of their processes to lower costs and give longer life to finishes in a wider variety of types.

• **Business Conditions** — Typical comment at the meeting: "Think we'll do pretty well this year, but we'll have to wait and see."

Custom platers report varied business.

They say they have been hurt by reductions in aircraft and missiles operations on the West Coast and automotive business in Detroit and Chicago. Other areas less dependent on single industries (such as Des Moines, Iowa) report a good level of business.

In all areas, there seems to be an increase in the less profitable, short runs or experimental jobs. Jobs lost by the custom platers are frequently pulled into production shops when capacity permits. It's one of the reasons why plating suppliers report sales of chemicals and supplies have held at good levels while new equipment is moving more slowly. The bulk of new equipment seems to be going to captive shops; custom platers are trying to hold down capital expenditures.

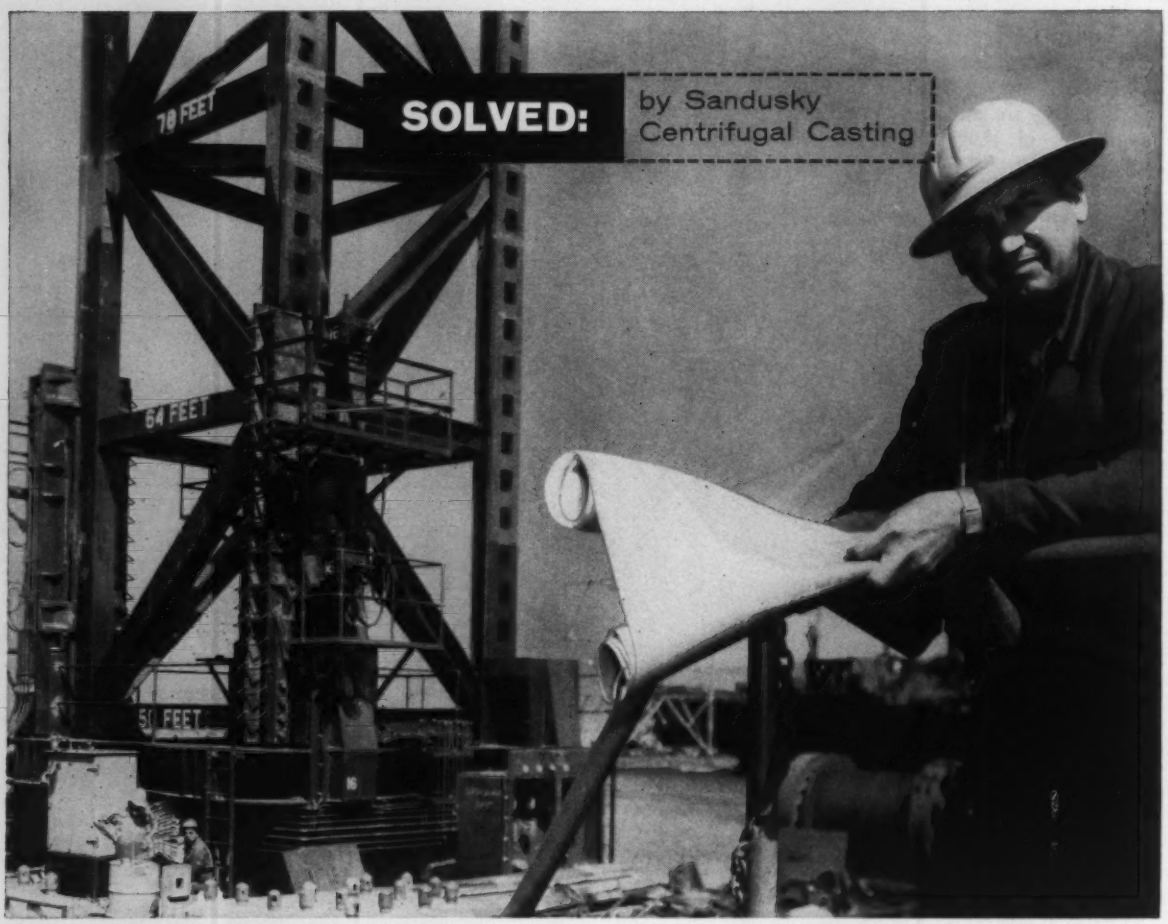
• **New Officers** — President for 1960-61 is Dr. W. A. Wesley of International Nickel Co.'s Bayonne, N. J., Research Laboratories. First vice president is Chester T. Borlet (Grand Rapids Brass Co., Grand Rapids, Mich.). John D. Nichols is executive secretary with headquarters in Newark, N. J.

• **Broad Range of Topics** — Technical sessions included such subjects as hydrogen embrittlement, corrosion, cleaning, and the removal of metal by plating in reverse.

One of the first papers covered the application of statistical quality control to plating processes. R. W. Steinmetz of Western Electric showed how methods can be applied to plating to cut costs and improve quality. The methods are used in the control of mass analysis and of plating thickness.

One morning was devoted to developments in gold plating processes. Papers were on such subjects as heavy deposits of gold from cyanide baths and plating for printed circuits from acid baths. In such applications, plate appearance is not as important as properties, the society was told.

Correlation of short term tests of bright work with service life has been improved, it was reported. Duplex nickel appears to offer improved corrosion resistance for major parts, particularly for outdoor exposure. It was noted that duplex nickel on zinc diecastings had a higher impact value and greater resistance to cracking during thermal cycles.



SOLVED: by Sandusky Centrifugal Casting

One of four 274 ft. high towers aboard the *George F. Ferris* showing method of installing hydraulic jacks built by Yuba Manufacturing Division, Yuba Consolidated Industries, Benicia, Calif. George Bauer, of Delong Corp., New York, is shown supervising construction while platform is being completed at Yuba's Richmond, Calif., plant.

YUBA gets quality-cost-delivery advantages by specifying 16 Sandusky cylinders

Sixteen 500-ton hydraulic jacks built by Yuba, for which Sandusky supplied the main cylindrical bodies, enable the new pipe-laying barge, *George F. Ferris,* to operate in waters 200 ft. deep!

This 5400-ton barge is equipped with four structural steel towers 274 ft. high. Four jacks on each of the towers provide the power to lower these steel "legs" to the ocean floor, raise the barge above the surface of the water, or retract the towers to render the barge navigable. The steel jack cylinders are Sandusky Centrifugal Castings, made to the requirements of ASME Code-approved SA-217, Section VIII, Unfired Pressure Vessels, to withstand operating pressures of 3000 psi. They were produced in 186″ lengths, machined to 24″ O.D. with 2″ thick walls and sectioned into four pieces 43″ long.

Yuba's selection of Sandusky Centrifugal Castings was based largely on three essential factors: QUALITY—meeting the exacting Code requirements . . . COST—saving about half the cost of an alternate method of manufacture . . . and DELIVERY—coming through on a tough time schedule by delivering all 16 cylinders within 21 working days!

When you need cylinders from 7″ to 54″ in O.D. and up to 33 feet long it will pay you to get in touch with us. Write for our latest booklet, *Your Solution To Cylindrical Problems* containing data on more than 70 ferrous and non-ferrous alloys.

SANDUSKY CENTRIFUGAL CASTINGS
FOUNDRY & MACHINE CO.

SANDUSKY, OHIO—Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

5902

Power Cutoff Saw Has 16 x 20 in. Capacity

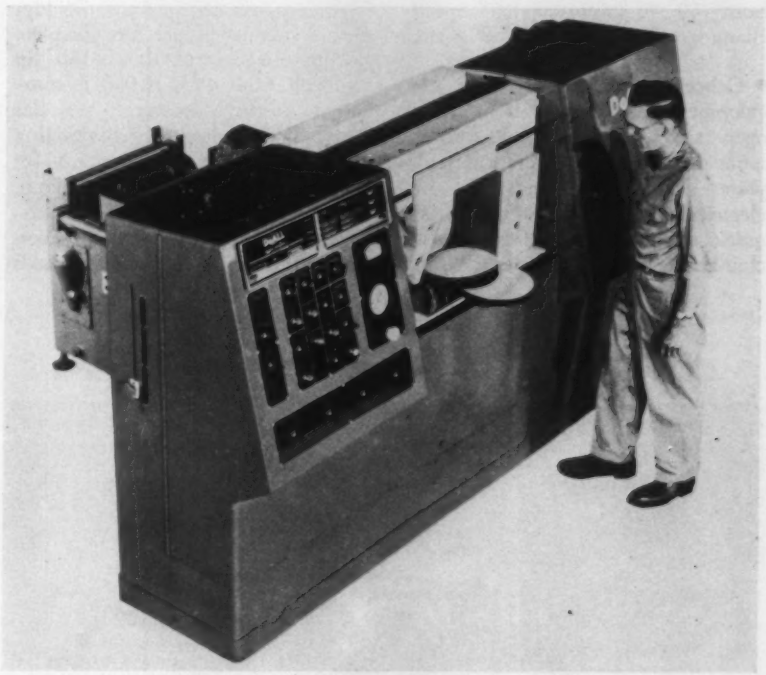
CONTINUOUS, high production work can be done with DoAll's Continental power cutoff saw. It's designed to use the company's new 2 in. tungsten carbide, Imperial, Super Demon, and Dart saw bands.

It has a capacity of 16 x 20 in., indexes automatically from 0 to 24 in. in thousandths and leaves a stub end of only 2½ in. With manual indexing that is reduced to 1 in.

• **Other Equipment**—A Model C-70 power saw comes with a large drive system.

In addition, DoAll has developed two grinders, a high production unit and a manual model. On another unit (an improved Contour-matic band saw) fixtured, high production sawing can be done. The equipment will be shown in Chicago at the Coliseum Machinery Show.

For further information, *write* DoAll Co., 256 N. Laurel Ave., Des Plaines, Ill.

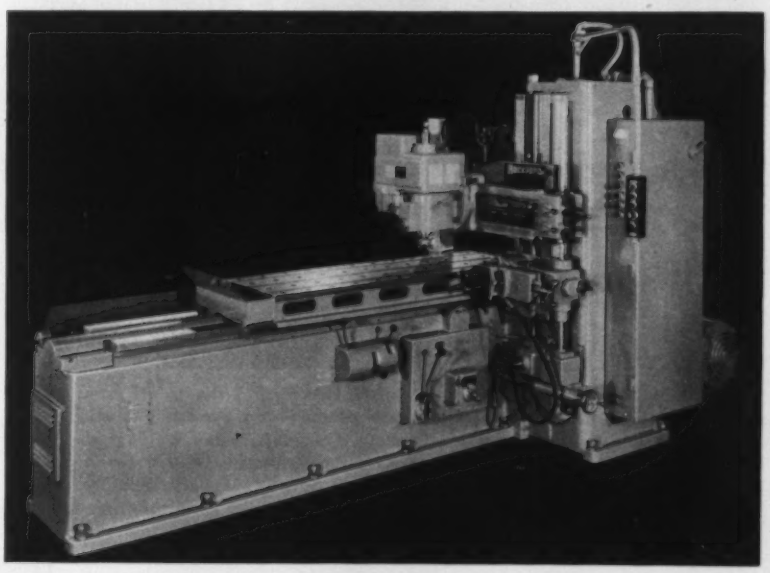


Shaper Is Convertible for Shaping or Milling

HERE is a Rockford open side shaper that is fully convertible for shaping or milling. This shaper equipped for milling can also be provided with a full form or rail template duplicator head for shaping.

A 15 hp hydraulic circuit provides 200 ft per minute maximum cutting and return speeds. A screw and double nut (on the outboard side) provides table drive for milling.

Both the table and the head milling feed screws are connected to a common gearbox driven by a dc motor. Infinitely variable feed rates from 1 to 100 in. per minute are supplied. Manual shifter levers are used for milling feed control. A removable outboard support makes the cross rail more rigid



when milling under heavy loads.

The milling head (3 hp gear driven design) is powered by an ac motor. The head has a 3 in. quill adjustment. Eight spindle speeds are provided in the range from 50 to 1200 rpm. Speed changes are made by pickoff gears.

• **Other Equipment**—Another development by Rockford is a 72 in. open side shaper with hydraulic table drive and Kopy-Kat rail template duplicator. Hydraulic and electrical lines are equipped with quick disconnect couplings to cut changeover time from duplicating to standard shaping in minutes.

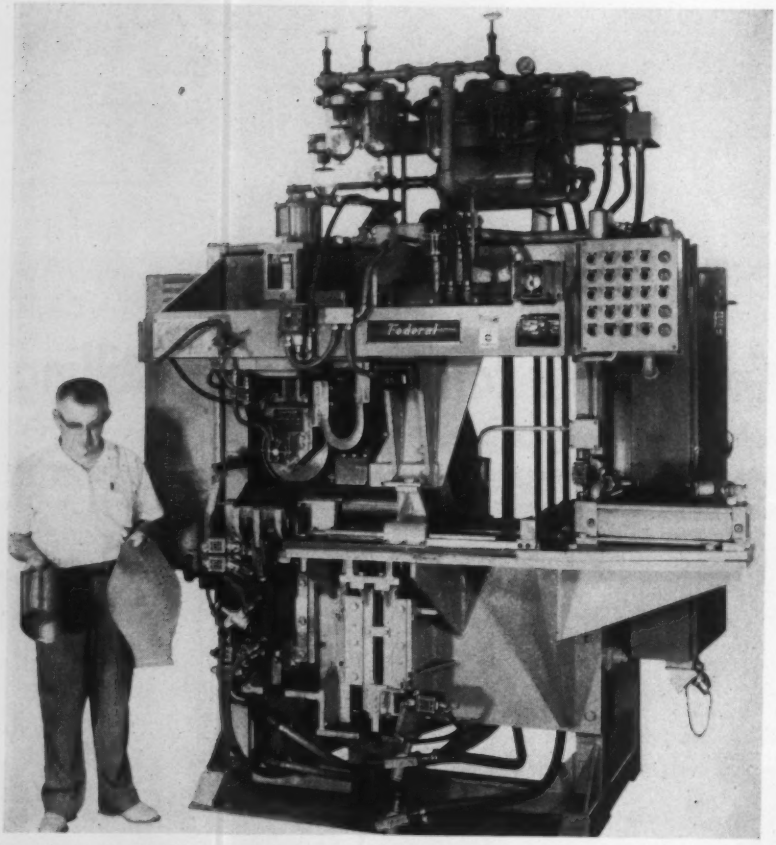
An 18 in. x 8 ft lathe with Kopy-Kat duplicator has 12 spindle speeds and 32 feed changes. It's powered by a 5 or 7½ hp motor and spindle speeds up to 1206 rpm are available. Standard lathework can be done by changing to the standard slide and compound.

A triple circuit, heavy duty, Hy-Draulic shaper-planer has complete pushbutton control. It's a 50 hp hydraulic unit with 18,000 lb maximum cutting pressure. It has Trava-Trol table stroke positioning to provide pendant operation for setting table stroke length and positioning without the use of reversing dogs or linkage. The dc Tool-Trol provides three traverse speeds for the heads, making possible tool positioning by pendant within 0.001 in.

A roll forming machine (Model N-MR-12) has a magnetic starter, two pushbutton stations, full length jog bar, direct chain drive with double power takeoff and micrometer, dial type, individual, upper spindle adjustments. It can handle sections such as lock seam tubing, acoustical ceiling sections, aluminum window screen sections, drawer slides, and aluminum siding.

The Maplewood No. 2 high speed cutoff machine does continuous high production operations. Features include a rigid, welded steel frame with an adjustable frame, 2 in. stroke, 176 rpm crankshaft speed, and a 1½ hp, 3 phase, 220/440 volt motor. The units will be shown in Chicago at The Machine Tool Exposition—1960.

For further information, *write* Rockford Machine Tool Co., 2942 Kishwaukee St., Rockford, Ill.



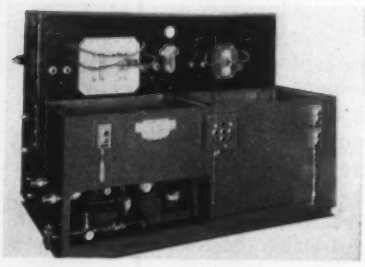
SEAMS 5 IN. LONG ARE WELDED BY THIS MACHINE. The travel head seam-welder transfers the blank from the load position into the forming unit, where it is formed into a shell and the side seam is welded. After welding, the forming clamps release and the transfer mechanism ejects the welded part from the machine. Weld pressure is about 1200 lb at 60 psi. Weld speeds are adjustable from 200 to 400 in. per minute. A 200 kva welding transformer supplies power. Over 500 parts an hour are produced. For further information, **write** Federal Machine & Welder Co., Warren, Ohio

Unit Does Hardening at High and Low Frequencies

MANY industrial requirements can be covered by the Ther-Monic unit which has dual facilities for oil and water quench in hardening applications. A selector switch controls the desired operating frequency and makes it possible to perform hardening applications at low or high frequencies.

The unit has a three-position work station and is equipped with a two position, low frequency of 450 kc and a single position higher frequency output from 2 to 7 mc. It can be used as a reservoir for both oil or water recirculating systems or for drop quench systems.

The left side of the table has a popup spindle for rotating, raising, or lowering the work in and out of the heating section. The spindle can



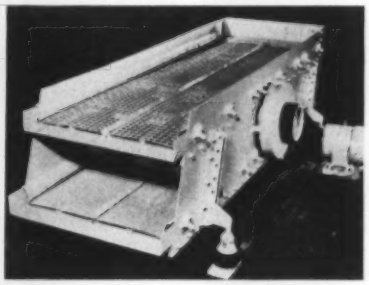
be used on both frequencies. The machine has an oil recirculating system and is equipped with stainless steel sinks.

For further information, *write* to Dept. PR-16, Induction Heating Corp., 181 Wythe Ave., Brooklyn 11, N. Y.

Vibrating Screens Have Modular Design

THE Ty-Rocket line of screens is vibrated by an off-balance shaft, supported in two bearings. It creates a high speed, circle-throw motion.

The screens are supplied without a supporting base. A modular design permits several different sizes to be assembled from standard components.



Four universal brackets mounted on the side of the frame permit spring mounted feet or overhead cables to be attached. You can select sizes from 3 by 6 ft to 6 by 16 ft in one, two, or three decks.

For further information, *write* W. S. Tyler Co., 3615 Superior Ave., Cleveland 14, Ohio.

Pneumatic Control Governs Transmission Speed

REMOTE or automatic speed control over an infinite range is provided by a Graham air control. Air signals (3 to 15 psi) produce linear speed variation from any desired maximum speed to zero.

Speed may be set by manual air valve or automatically by a signal from pneumatic transducers. Response is fast and accurate.

A pinion driven by a rack is mounted on the piston of the pneumatic actuator. The pinion shaft carries a steel cam cut so that equal changes in the air pressure signal

RADIATION CONTROL

AccuRay® instrumentation is based on the radiation of gamma rays from a source unit containing radium-226 or cesium-137. Source units are effectively shielded by housings cast in Meehanite by Hamilton Foundry. The density, and soundness of Meehanite castings provide the positive protection essential for safe and reliable instrumentation.

When buying castings, the skill and integrity of Hamilton Foundry is your best insurance that specifications—and delivery schedules—will be met.

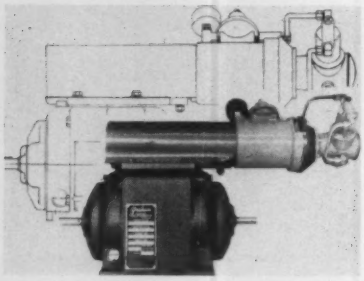
**AccuRay is the registered trade mark of Industrial Nucleonics Corporation*

GRAY IRON • ALLOYED IRON • MEEHANITE® • DUCTILE (NODULAR) IRON • NI-RESIST • DUCTILE NI-RESIST • NI-HARD

HAMILTON FOUNDRY INC.

1551 LINCOLN AVENUE • HAMILTON, OHIO • TWinbrook 5-7491

NEW PRODUCTS and equipment



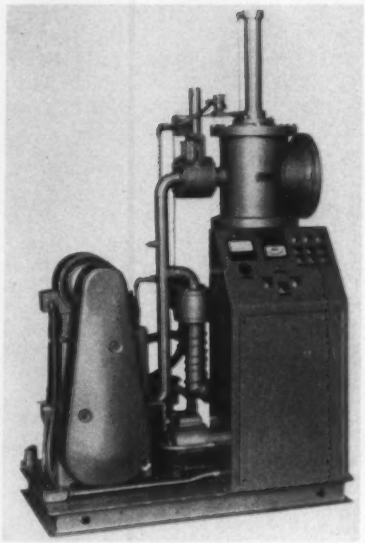
will produce equal changes in speed. The design is suitable for precise speed or metering control and for use in automatic speed control systems.

For further information, *write* Graham Transmissions Inc., Menomonee Falls, Wis.

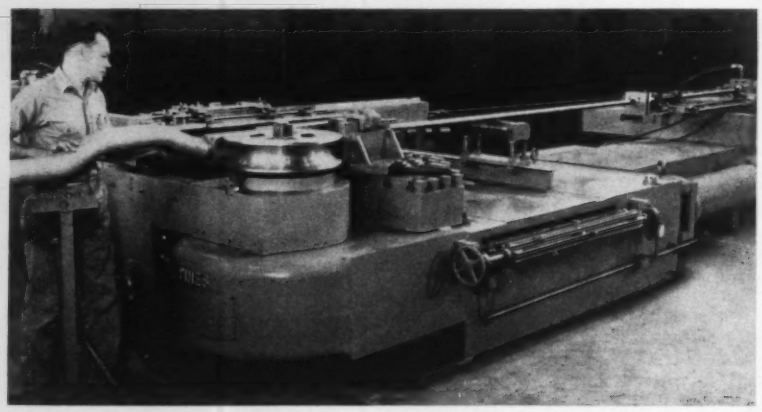
Vacuum Pumping Systems Come as Packages

HIGH volume evacuation can be done by a series of Stokes packaged vacuum pumping systems. The systems arrive assembled, ready for connecting to the customer's water, air, and electricity supply lines.

An oil diffusion pump or an oil booster pump plus a mechanical backing pump are mounted together on a common base plate. The control console is fully instrumented and all interconnecting piping, valves, and wiring are installed. The series includes 6, 10, and 16 in. units. Safety devices include fail-safe controls for automatic shutdown in the event of power failure, Underwriters' Laboratory listed wiring, and belt guards.



For further information, *write* F. J. Stokes Corp., 5500 Tabor Rd., Philadelphia 20, Pa.



Bending Units Do Heavy, Light Work

HEAVY BENDING requirements of industries that form large pipes, tubes, channels, angles, and solid bars, can be met by an addition to the Pines line of standard rotary bending machines. Two versions are available.

When set up for heavy materials, the machine is called the Model 6 and will handle production bending of extra heavy steel pipes up to 6 in., channels to 9 in. x 15 lb, square steel bars to 4¼ in., round solid steel bars to 5 in. diameter, and steel angles to 8 x 8 x ¾ in.

When adapted for thin wall tubing, it's designated Model A-8. It can bend tubes up to 8 in. OD with wall thicknesses up to 0.250 in.

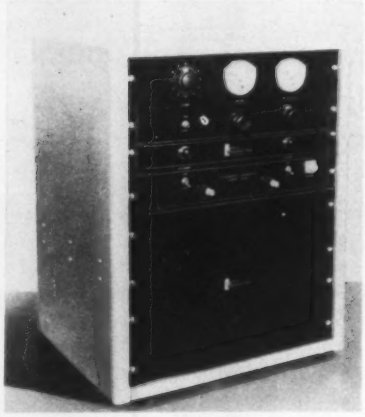
Both versions are self-contained, have hydraulic operation, and dependable bend accuracy within ±½ degree. Space required: About 14 x 32 ft (including arm swing). A 20 hp motor powers the hydraulic system. Angles up to 180 degrees (plus overbend to compensate for springback) are formed in a single cycle.

For further information, *write* Pines Engineering Co. Inc., 601 Walnut St., Aurora, Ill.

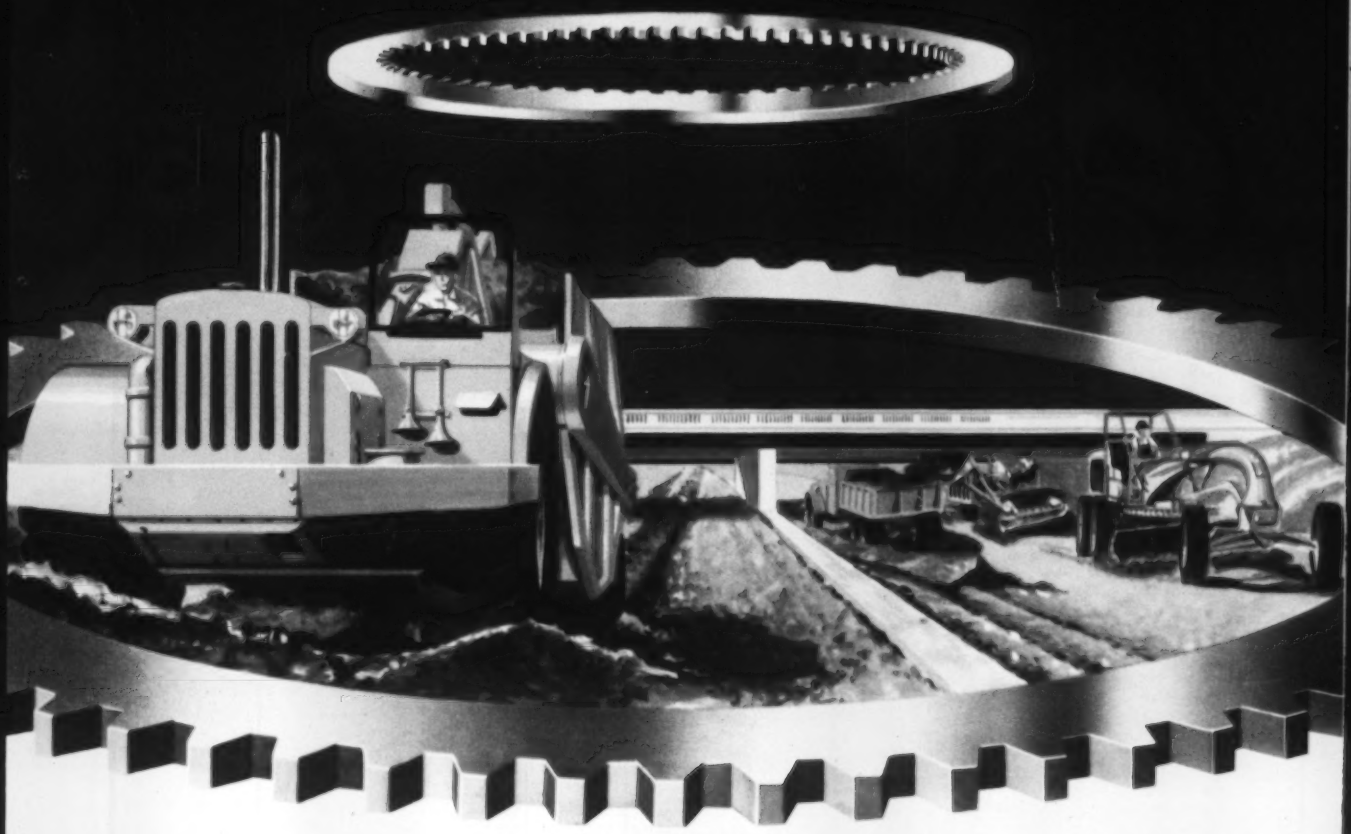
Ultrasonic Generator Rated at 1000 Watts

A 1 KW ultrasonic generator (Model G-310) is rated at 1000 watts average power and 2000 watts peak power at 38 to 42 kc. It will drive 192 sq in. of barium titanate crystal radiating surface.

The generator is recommended for conveyorized, bath, or manual production line cleaning and degreasing, pilot plant testing of large scale cleaning, or adding ultrasonics to a conventional vapor degreaser or other cleaning equipment.



The unit operates on 115 volts at 20 amperes and is powered by two vacuum tubes. It's 21¾ in.



Ingersoll CROSS-ROLLED Clutch Steel
Helps Move the Earth

To meet the punishing demands of off-highway equipment, Ingersoll Steel Division melts, CROSS-ROLLS, and processes to customer specifications, special analysis clutch steel. In short, Ingersoll can:

- Melt (electric furnace) steels to special analyses
- CROSS-ROLL ingots to sheet and light plate
- Blank or shear
- Produce rings with internal or external teeth
- Rough and/or finish grind the surfaces

Ingersoll clutch steel is also widely used in the automotive and tractor industries.

Write for Ingersoll's new full-color facilities and products brochure: "Experts in Specialty Steels."

Ingersoll's gear shapers, hobbing machines and surface grinders produce precisely finished clutch plates to customer specifications.

INGERSOLL B-W STEEL

Ingersoll STEEL DIVISION

Borg-Warner Corporation

NEW CASTLE, INDIANA

FOUND!

A WAY TO DEGREASE MORE PARTS PER DOLLAR OF CLEANING COST

What makes the big difference in vapor-degreasing cost?

It's not what you pay for solvent. It's how long your solvent keeps working between degreaser cleanouts.

WHAT'S PSP? It means "permanent staying power." It's what you get with Nialk TRICHLOR. The stabilizer in this solvent doesn't wear out. You don't need to add fresh stabilizer when you degrease with Nialk TRICHLOR. You don't have to check the pH. The stabilizer stays with the solvent and keeps on protecting it. In the bath. In the vapor. Even after repeated distillation.

WHY IS PSP IMPORTANT? Users report substantial savings with this better, more stable trichlorethylene. Degreasers run without shutdown for weeks—even months longer between cleanouts, in many cases. Rejects are down sharply. Less solvent is needed, because less goes down the drain in unnecessary cleanouts.

To start saving in your plant—soon—see your Nialk TRICHLOR distributor. He can show you why your best buy is the solvent that doesn't wear out prematurely. Call him today.

NEW 36-PAGE BULLETIN explains fully how you get more and better vapor degreasing for the money with Nialk TRICHLOR. Shows basic types of vapor degreasers. Discusses cycles, operating procedures, stabilizers, causes of solvent contamination, solvent recovery, trouble shooting. Ask your distributor for a copy or write us.

Nialk® Trichlor, a product of

HOOKER CHEMICAL CORPORATION

1208 Union Street, Niagara Falls, N. Y.

Sales Offices: Buffalo Chicago Detroit Los Angeles New York Niagara Falls Philadelphia Tacoma Worcester, Mass.
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HOOKER CHEMICALS PLASTICS

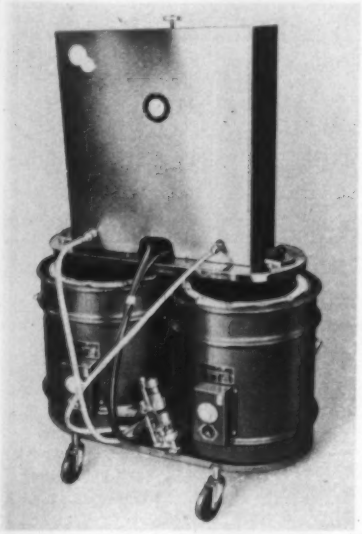
wide, 18 in. deep, and 28⅝ in. high. It weighs 225 lb.

For further information, *write* National Ultrasonic Corp., 111 Montgomery Ave., Irvington, N. J.

Equipment Applies Many Two Part Materials

CONTINUOUS pumping, metering, and applying of flowable, two part compounds can be done by a production machine called Duo-Flo.

It can accurately meter a wide range of compounds (two part) up to 20,000 cps viscosity, 5 parts per hundred to 50-50 epoxies, poly-



urethanes, polyesters, and foam. The unit has high volume capacity, internal mix, adjustable spray range and adaptability to 55 gallon drums.

For further information, *write* Pyles Industries Inc., 20855 Telegraph Rd., Detroit 41, Mich.

Portable Hand Hoist Has Capacities to 4 Tons

A PORTABLE hand hoist uses aluminum in nonload carrying components to decrease weight. Ductile, shock resistant, alloy steel is used in the load bearing parts.

The chain and load wheel is self-lubricating and the oil reservoir

UNITCASTINGS provide answer for difficult parts problem!

Again, Unitcast Foundry Engineering proved invaluable in producing this hydraulic valve body casting.

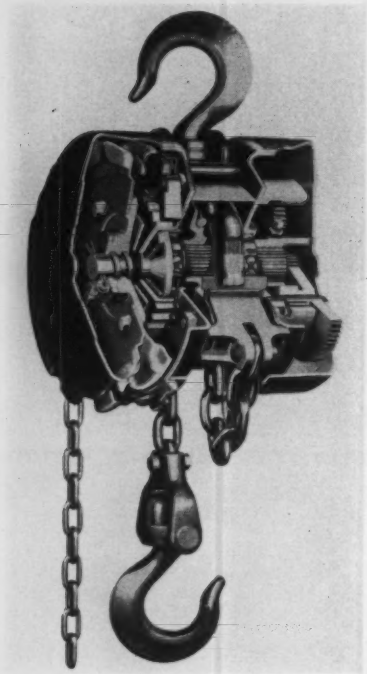
Faced with the necessity of a durable, more compact unit, the customer investigated the advantages of *cast steel*. Firm specifications included small and irregular internal passages that were impossible to machine blind. Tolerances were close and exceptionally clean internal surfaces were a necessity. Shell cores, as illustrated, were used in a green sand mold. The system was streamlined and the more compact unit did not hamper the mechanism. Costs were reduced to a fraction of the alternate composite machined assembly.

Unitcastings can possibly meet your unusual problems, too. Why not investigate today . . . call for a Unitcast Sales Engineer.

UNITCAST CORPORATION, Toledo 9, Ohio
In Canada: CANADIAN-UNITCAST STEEL, LTD., Sherbrooke, Quebec

Unitcast

SPECIFICATION STEEL CASTINGS



requires only an occasional refilling. The gear train is enclosed in a permanently lubricated, oiltight chamber. It's available in capacities of ½, 1, 1½, 2, 3, and 4 tons.

For further information, *write* Wright Hoist Div., American Chain & Cable Co. Inc., York, Pa.

Vibratory Finisher Has Elliptical Movement

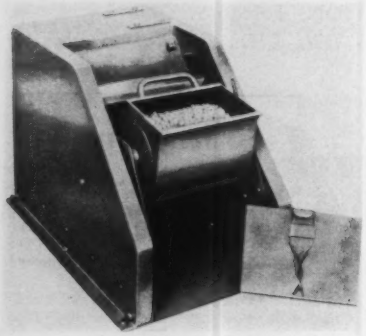
A TUB type vibratory finisher does rapid finishing without causing impingement damage to workpieces. The work container has a controlled, positive elliptical movement.

It has infinitely variable amplitude to ⅜ in. Amplitude is positive and is generated by mechanical cam action.

It does not vary from changes in frequency or weight of load and it's not affected by the reaction of the suspension system.

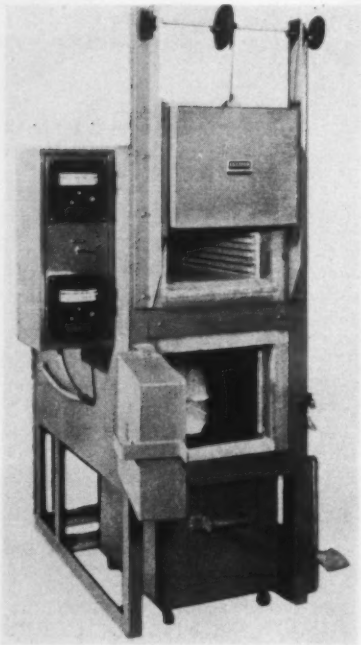
The motor provides a frequency range from 700 to 1800 cpm through a V belt drive. Capacities of 1, 5, 10 cu ft or larger can be ordered.

For further information, *write* M-F Equipment Co., Newark, N. J.



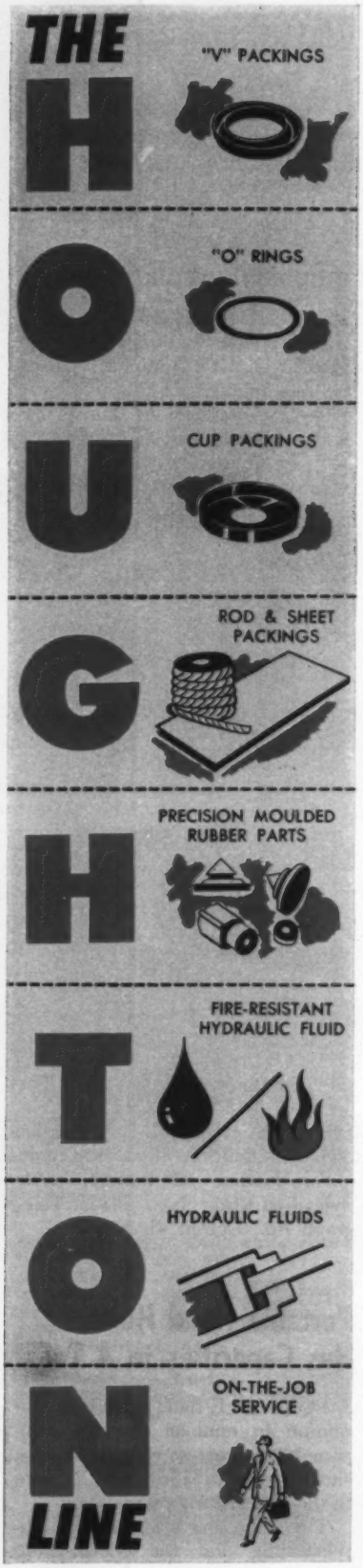
Heat Treating Furnace Comes in Ten Sizes

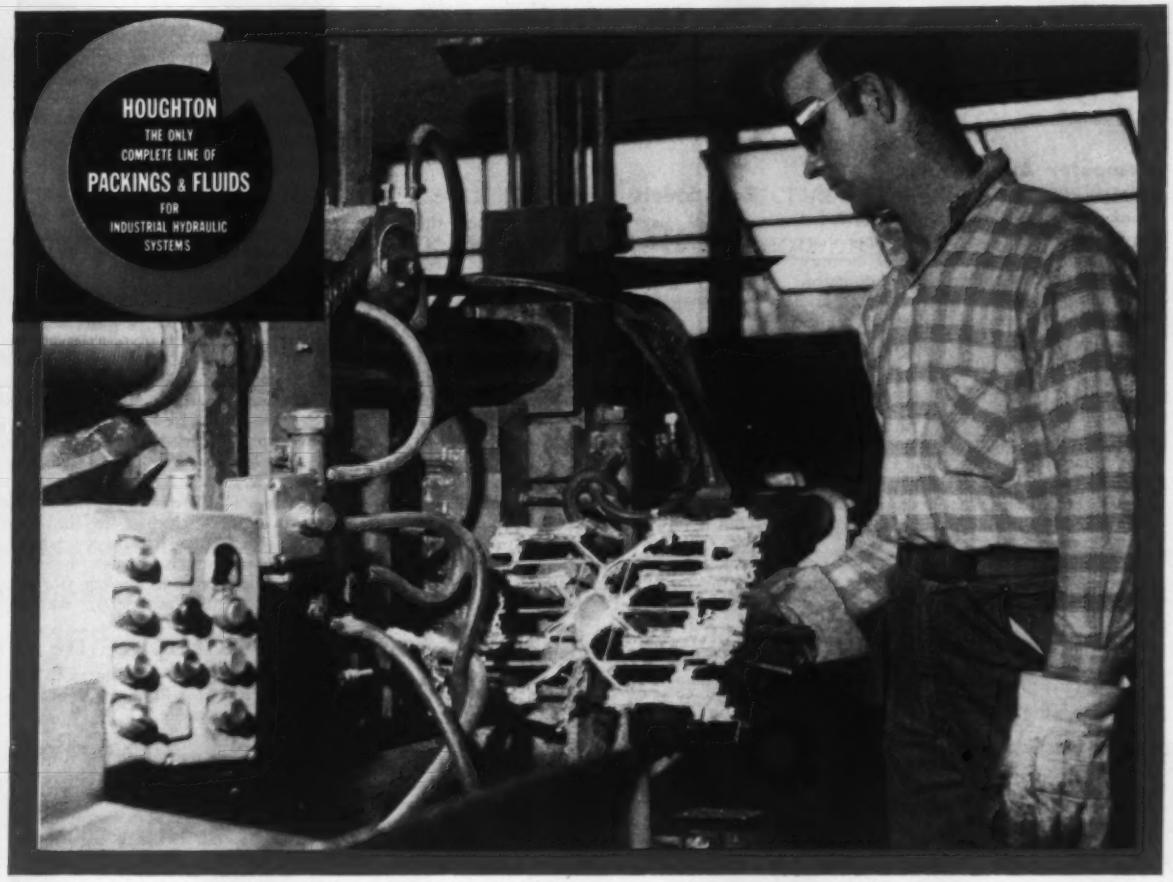
THE FURNACE series designated 8012 is a combination type. With this electric unit you can do hardening in the high temperature furnace, drawing in the low temperature furnace, and quenching in the rollaway quench tank.



The high temperature chamber operates to 2300° F and the low temperature chamber to 1250° F. Ten standard sizes are available in the 8012 Series. All Lucifer furnaces are complete units only requiring connection to electrical power supply.

For further information, *write* Lucifer Furnaces Inc., Neshaminy, Pa.





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NEW literature

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Computer Applications

"Mathematical Applications of the Dynamic Storage Analog Computer" discusses sequential calculations through time sharing of computer elements; use of memory to obtain definite integrals for automated, self-solution of optimization problems; and the solution of partial differential equations. Computer Systems Inc., Culver Road, Monmouth Junction, N J.

Vanadium Catalysts

A bibliography of references to vanadium catalysts covers the period 1940 through 1954. Vanadium Corp. of America, 430 Lexington Ave., New York, N. Y.

Grouting Practices

Successful grouting techniques are described in a 16 page publication. Common methods of grouting different types of equipment, mixing and placing of grout, and cold and hot weather grouting are outlined and illustrated. Information on recommended mixes and estimating tables is included. Specify Bulletin E-1d. Master Builders Co., Cleveland 18, Ohio.

Carbide Compositions

More than 75 uses of Kennametal and Kentanium are illustrated in a 24 page booklet (No. B-666). Cost saving applications in more than 25 industries are described. The case histories show how designers and engineers have used these materials to take advantage of the hard carbide compositions. Kennametal Inc., Latrobe, Pa.

Heat Resistant Alloy

Described in a 4 page folder is a heat resistant alloy (Supertherm) for static, centrifugal, and shell molded castings. The material has good performance capabilities in the 1800 to 2300° F range. The folder presents information on physical constants, expansion coefficients, general characteristics, mechanical properties at room temperatures and high temperature properties. Electro-Alloys Div., American Brake Shoe Co., 1700 Taylor St., Elyria, Ohio.

Heat Resistant Coatings

Bulletin 1570 describes coatings for metal exposed to high temperatures and corrosive environments. Dampney Co., Hyde Park, Boston 36, Mass.

Glass Fiber Data

Technical data on properties of glass fiber are included in a 4 page bulletin. Applications discussed include package cushioning, vibration damping, machinery mounts, acoustical isolation, and molded insulation. Fibrous Glass Products Inc., a subsidiary of Pall Corp., Alpha Plaza, Hicksville, N. Y.

Glass, Plastic Polishing

"Cerium Oxide for Glass Polishing," 8 pages, describes rare earth processing, polishing oxide evaluation, and several theories on glass polishing. Vitro Chemical Co., 342 Madison Ave., New York 17, N. Y.

Tool Steels

A 19 page bulletin describes three grades of air-hardening tool steels. The discussion includes metallurgical characteristics and instructions for working. Bethlehem Steel Co., Bethlehem, Pa.

Resistance Alloy

Technical data about a modified 80-20 nickel-chromium resistance alloy (Chromel-AA) are presented in an 8 page bulletin. The material was developed for heating elements in controlled atmosphere furnaces. The presentation includes a table of physical properties, typical life and temperature resistance curves, and test data showing resistance to carburization and sulfur corrosion in controlled atmospheres. Hoskins Mfg. Co., 4445 Lawton Ave., Detroit 8, Mich. (See Page 102.)

Hole Sizing, Finishing

A hole sizing and finishing technique is described in a 12 page technical bulletin. The process (called ballizing) consists of pressing a precision ball through the unfinished hole to bring holes accurately to size with a low microinch finish. It tells how to determine production details and gives case histories on ballized parts. Industrial Tectonics Inc., 3686 Jackson Rd., Ann Arbor, Mich.

NEW BOOKS

Welded Steel Conveyor Pulleys—Recommended Load Ratings for Standard Pulleys, Multiple V-Belt Drive & Mechanical Power Transmission Association, 27 E. Monroe St., Chicago 3, Ill., 15 pages, $1

Included is a tabulation of load ratings for standard welded steel conveyor pulleys, a list of the pulley diameters considered standard, and a list of pulley face widths. This is the first standard issued on welded steel conveyor pulleys. It offers a basis for efficient and economical pulley selection.

Foundry Radiation Protection Manual, American Foundrymen's Society, Golf & Wolf Roads, Des Plaines, Ill., $9 (members $6)

Radiation protection controls for the foundry industry are described. The book begins with basic information about radiation characteristics and describes the sources being used in foundries. It covers a wide range of radiation origins, including x-ray sources.

Honeycomb Sandwich Design, Hexcel Products Inc., 2332 Fourth St., Berkeley, Calif., 45 pages, 50 cents

This booklet offers a convenient summary of sandwich design methods complete with formulas and worked out examples for stress computations on typical sandwich structures. The sections cover sandwich theory, impact, fatigue, creep, environment, selection of facings, selection of adhesives, selection of core material, and other considerations. A bibliography is included.

How to Design & Buy Investment Castings, Investment Casting Institute, 27 E. Monroe St., Chicago 3, Ill., 176 pages, $3.95

Seven chapters cover advantages of the investment casting process, basic production techniques, choice of alloys, vacuum metallurgy, quality of cast parts, designing for investment castings, and how to buy investment castings. It includes ICI specifications for investment casting alloys and an alloy selection chart. A comprehensive index and a special appendix covering investment casting terminology are included. The latest techniques of producing investment castings in flask-type investment molds and the newer ceramic shell investment molds are described. Developments in vacuum technology (for producing alloys and cast parts) are also presented.

Tungsten, Chemical & Metallurgical Div., Sylvania Electric Products Inc., Towanda, Pa., 44 pages, $1

Here's a complete bibliography on tungsten. It includes references appearing in U. S. and foreign publications from 1953 to 1958. Each reference includes the name of the author, a brief description of the article, and where it appeared. In addition, it contains a subject index, a listing of physical properties, and 19 phase diagrams. The book contains 409 references.

Electrical Efficiency in Industrial Plants, Edwin S. Lincoln, F. W. Dodge Corp., 119 W. 40th St., New York 18, N. Y., 235 pages, $9.50

Reduction of electric power and lighting costs in industrial plants and large commercial buildings is discussed in this handbook. It shows how to make surveys of load, power factor, voltage, lighting, wiring, and electric protection. Full analysis of power costs is included, with particular attention to methods of lowering rates by minimizing peak demands. Power factor, choice of voltage, safety, inspection, and maintenance are presented directly and simply. Detailed case studies are used.

Radiation Pyrometry and Its Underlying Principles of Radiant Heat Transfer, Thomas R. Harrison, John Wiley & Sons Inc., 440 Fourth Ave., New York 16, N. Y., 234 pages, $12

Theoretical and practical principles of radiation pyrometry are discussed in this comprehensive treatise. The first three chapters present the laws of emission, absorption, reflection, and transmission of thermal radiation (applicable to radiant heat transfer and radiation pyrometry). Other chapters include descriptions and mathematical analyses of physical and operating characteristics of radiation pyrometers and the application of emittance corrections.

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New Orders Exceed Shipments

INCOMING ORDERS are running ahead of shipments for the first time since March, boosting hopes for an upturn in steelmaking.

August bookings will be about 10 per cent larger than last month's and prospects are bright for a gain of similar size in September. At the moment, there's little evidence in the order books to support those predictions, but steelmakers are confident that the tonnage will materialize. As long as consumers can count on fast deliveries, they'll delay ordering until the last minute. They'll probably try to book tonnage for this month as late as Aug. 22.

LIQUIDATION TO END—Today, steelmakers are getting four to five times as much last minute tonnage as they booked in March or April. Late orders may double again this month, but when they do, users will find that they can no longer get steel "off the tailgate." Leadtimes will go out, and we'll see a cessation of inventory cutting. What the industry needs most for recovery isn't a lot of orders from the automotive industry. It's reversal of the inventory cycle—a massive shift by consumers of all sizes from policies of liquidation to those of accumulation. The turning point may come in September.

SMALL BUILDUP SEEN—In early autumn, the buildup will be small. Most consumers will buy only as much steel as they're using. A few will add to their stocks. As manufacturing activity picks up, inventories will gradually increase. Toward yearend, the possibility of higher prices will undoubtedly stimulate some hedging.

PREDICTION FOR '61—Looking ahead a little, market analysts of the leading steel companies don't share the pessimism of the noted economist who recently predicted a recession for 1961. They agree that some segments of the economy may revert to 1958 levels, but they don't see the steel industry duplicating its recession year performance (85 million ingot tons). Reason: Inventories won't be high enough to permit a long, drawn-out liquidation of the 1958 variety. Even though there's little likelihood of a boom in any major steel consuming industries next year, the analysts forecast a drop of only 5 per cent in ingot production. Assuming that this year's output reaches 108 million tons, you can look for 103 million tons in 1961.

STAINLESS BRIGHTENS—Thanks to some sizable releases from automakers, stainless steel producers expect their August bookings to be about 40 per cent larger than last month's. In one firm's opinion, September and October may be "terrific." Less optimistic, another company points to the huge inventory of unsold 1960 cars and says automakers are deferring orders. Mill inventories of finished products remain high, but in-process inventories are shrinking. Comments one sales executive: "If we got two months of good bookings, we'd have to extend deliveries."

Once hopeful that stainless shipments would break the 1956 record of 688,000 tons a year, marketing men are retrenching. But they expect to top last year's 615,000 tons.

OPERATIONS ON MEND—Look for steelmaking operations to reach 60 per cent of capacity by the end of the month. Last week, the industry resumed its gradual recovery with an ingot rate upturn of 1.8 percentage points. Furnaces were operated at 55.1 per cent of capacity, the highest rate since late June. Production was about 1,570,000 ingot tons.

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*Current prices were published in the Aug. 1 issue and will appear in subsequent issues.

Production line strapping of tin plate coils

Packaging of tin plate coils is now on a production line basis in speed and low cost. Fast, dependable Signode air power tools take ¾″ and 1¼″ steel strapping from the dispenser, eliminating the waste of cut-to-length strap. Overhead tool suspension systems and engineered dispensers add mobility and save more time and effort. Engineered installations by Signode save time and money. Write for more information. Ask for free copy of "Air Power Tensioners and Sealers."

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Bearing Sales Roll Toward New Record

Bearing Shipments

(Millions of dollars)

1960*	935
1959	814
1958	588
1957	685
1952	580
1944	417

*Estimated by STEEL.
Source: U. S. Department of Commerce.

ANTIFRICTION bearing manufacturers are smiling broadly as they contemplate a record year. They're not quite as ebullient as they were last December—when Department of Commerce forecasters predicted their shipments would jump as much as 20 per cent—but they're still confident that industry sales will exceed last year's record of $814 million.

Optimists predict that shipments will advance 15 per cent to $935 million (see table). Conservatives see a 5 per cent gain.

• **Spotlight on Detroit**—Hopes for solid improvement are based mainly on the belief that 1960 auto production will top last year's by about 15 per cent. Automakers are the major consumers of antifriction bearings—they take about 40 per cent of annual production. In late March and early April, there were some sizable automotive cutbacks, but orders firmed in May and have since been on the upswing. Here's what some of the leading bearing-makers are saying about business:

"We've seen considerable revival in orders for military hardware."

"Dollarwise, our first quarter sales set a record. June was the first month this year that incoming orders exceeded shipments."

"Sales to auto and outboard motor producers are excellent. Demand from home appliance, portable electric tool, lawn mower, machine tool, and chain saw industries is fair. Aircraft is holding its own, but earth moving equipment demand is in a slump."

• **Foreign Competition**—Although a lot of heat over imported bearings has been generated in some quarters, there seems to be more smoke than fire. Distributors are concerned because some Japanese producers have signed up U. S. sales agents who are quoting delivered prices that are 20 to 30 per cent below the published quotations of domestic firms.

At least one U. S. bearing manufacturer has broadened its line by signing a sales agreement with a Japanese firm. As exclusive U. S. distributor for Japanese bearings of a type that it does not produce itself, the U. S. firm upholds domestic quotations.

To protect their foreign markets, U. S. producers are establishing subsidiaries or building plants in Canada, Europe, South America, and Australia. Such moves may soon be mandatory if they hope to sell foreign subsidaries of their U. S. customers.

• **Imports vs. Exports**—Last year, the value of imported bearings was $10.4 million, or 1.2 per cent of the dollar volume of shipments made by U. S. producers. (In the three preceding years, imports averaged 0.48 per cent of domestic shipments.) Last year, U. S. bearing

manufacturers' export sales totaled $41.9 million—more than four times the value of imports. However, the ratio of imports to exports is increasing. In 1959, it was 24.8 per cent. In seven preceding years, the average was only 8.5 per cent.

U. S. bearingmakers say the import threat could become more serious if the profit squeeze forces their customers to cut corners. Some business has already been lost to Japanese competition in the vacuum cleaner field. Why haven't the foreign producers made greater inroads? Market analysts advance three principal reasons:

1. Most bearings go into mass production industries where users have neither the space nor the money to maintain big inventories. Tight deliveries are the rule, and suppliers that are 6000 miles away can't adjust rapidly to increases or cutbacks in customers' production schedules.

2. Sellers must provide engineering service and solve customers' problems on short notice.

3. Returning imported bearings for credit involves a lot of customs red tape.

"All exposed and unexposed surfaces shall be of STAINLESS STEEL..."

Cafeteria and Executive Kitchen, *Continental Grain Co., Offices: New York City. Designed by Designs for Business, Inc.*, New York, N. Y. Fabricated by *Stainless Food Equipment Co.*, Newark, N. J. Installed by *Ben Mernit*, New York City

■ The specifications for this executive cafeteria called for all kitchen metal surfaces, both exposed *and* unexposed, to be constructed of stainless steel. Only *lifetime* stainless steel can offer the durability and ease of maintenance necessary for maximum sanitation in food handling.

■ MICROROLD STAINLESS STEEL was chosen for its consistent uniformity of gauge, outstanding finish and well-known fabricating qualities.

■ *Why not investigate the advantages of stainless steel for your next project?*

WASHINGTON STEEL CORPORATION
8-O WOODLAND AVENUE • WASHINGTON, PENNSYLVANIA

• **Toward Standardization** — Approval by the American Standards Association (ASA) of an identification code for ball and roller bearings that is similar to the one recommended by the International Organization for Standardization is expected to spur export sales of U. S. manufacturers. It will mean that all bearings similarly marked are interchangeable, regardless of the country or manufacturer. In the U. S., it will give consumers better control of their inventories. In the past, they've been hopelessly confused because each manufacturer gave his bearing a number that suited his fancy. In one instance, it was found that European and U. S. producers were making and selling the same type under 17 different numbers. Manufacturers will probably be slow to adopt the system, but some are showing the new ASA code numbers in catalogs opposite their part numbers.

• **Boom for Miniatures**—Manufacturers of miniature precision bearings expect a 25 to 40 per cent increase this year over 1959, when sales were about $23 million. Their sales account for only a small part of the industry's over-all annual volume, however.

Miniature bearings (⅜ in. OD and under) are used mainly in analog computers for missiles, space probes, and aircraft; dentists, drills (hand pieces); and small blowers and motors. The Defense Department's budgetary shift from aircraft to missiles is good news for makers of miniature bearings because missiles require more bearings than aircraft and bearings of higher precision. Bearings with tolerances of one 20-millionth of an inch are being produced for nonjammable inertial guidance gyros of the newer missiles.

• **Price Outlook**—In an era of constantly rising costs, several producers have taken the rather unusual step of guaranteeing prices to their original equipment manufacturing customers for calendar 1960. One company upped quotations on part of its line by 3 to 5 per cent in April, then promised no more increases before July 1, 1961.

Several manufacturers indicate, however, that a steel price increase this fall could push bearing prices upward.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 132 & 133

Sheet producers note a moderate pickup in demand, and some report that for the first time in several months orders are surpassing shipments. The uptrend in new business is expected to continue gradually through August and to accelerate over the balance of the year. September bookings are expected to be 10 to 15 per cent larger than those for the current month.

Automakers are still holding back, making some suppliers think that they can't decide on production schedules for the initial runs of the new models.

Hot rolled sheets are being promised for shipment within two to three weeks and even less where bands are in stock. Cold rolled sheets can be had within two weeks where bands are on hand and around five weeks where they're not. Galvanized sheets can be had in about five weeks.

The lag in household appliance business is seriously felt in the Philadelphia area, along with continued suspensions for mass vacations in the general consuming industries. Most New England sheet and strip consumers are holding back orders until after Labor Day; they're confining orders to fill-in lots. From now until the yearend, inventory tax considerations will be a factor in forward buying.

Imported Steel . . .

Imported Steel Prices, Page 137

Steel imports continue to plague West Coast steel producers. They now constitute a "painful squeeze" whereas they used to constitute a "pinch," one producer says.

One important steel firm on the coast says its steel exports are only half what they were in 1958. Another adds that enough steel is coming into the West Coast from Europe, Japan, and Australia to keep 3500 to 4000 of its employees busy all year if it had the business.

Many mills in foreign countries have modern U. S. steelmaking equipment and are sending steel products of the highest quality to this country.

Price is the big factor in the increased demand for foreign steel. Some imported products sell as much as $58 a ton under domestic in the Far West. Some foreign prices advanced fractionally last week in the Houston area. These upward revisions were made on angles, reinforcing bars, rounds, flat bars, channels, and I-beams.

Steel Bars . . .

Bar Prices, Page 131

Hot rolled carbon orders may be a shade larger. Producers generally anticipate little gain over the remainder of this month, pending the close of the vacation season. Some New England firms which hold defense contracts have released slightly larger bar orders.

Delivery promises range around two to four weeks, and until they begin to tighten, many buyers will continue to operate hand to mouth. Users are still in the process of reducing inventories, although the rate of reduction has slowed considerably.

Cold drawers report continued

New Catalog Describes Latest Developments in Waste and Refuse Storage and Removal

New Techniques Cut Cubic Yard Removal Costs to Record Low

This new 28-page color catalog describes remarkable new developments in waste control and disposal that have, within the last two years, obsoleted many systems now in use. Cubic yard handling costs have been reduced to a point where many firms and municipalities are saving thousands of dollars annually that they were previously spending to operate old-style equipment.

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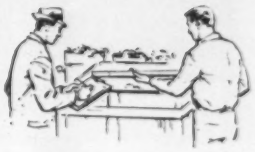

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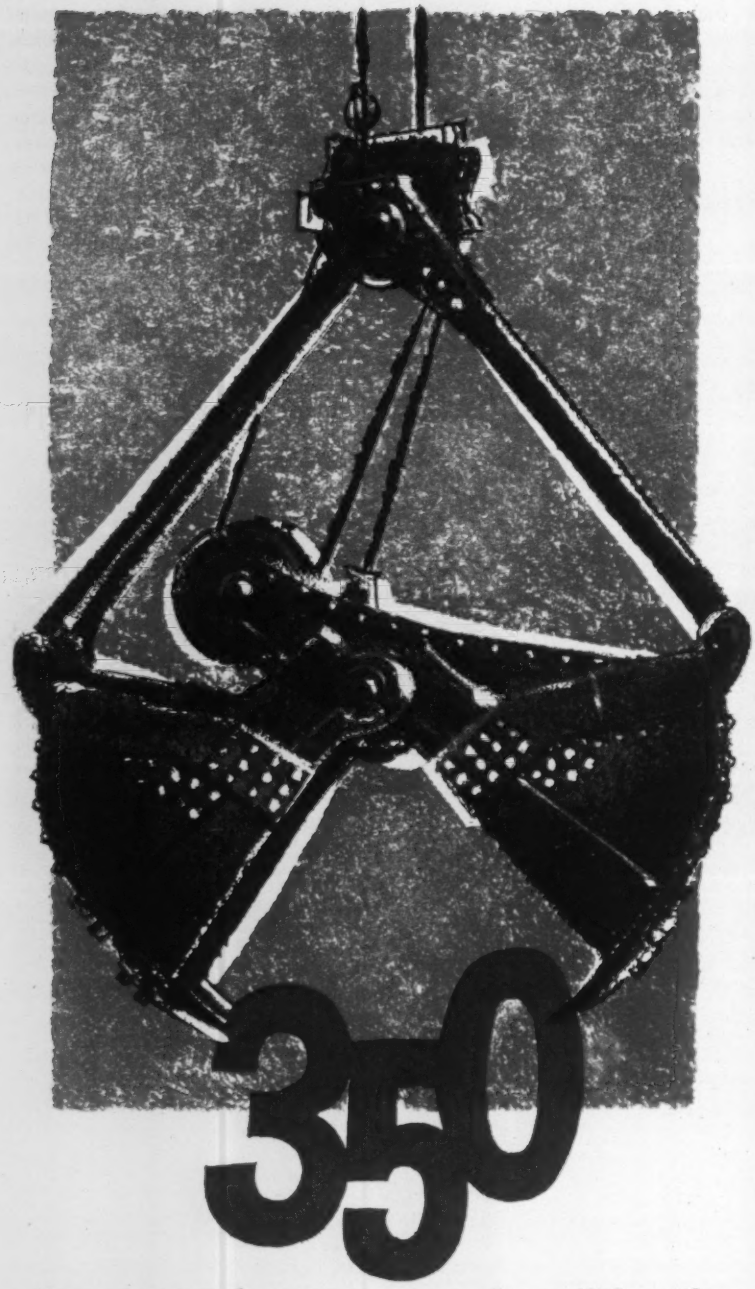

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Reinforcing Bars . . .

Reinforcing Bar Prices, Page 132

Concrete reinforcing bar order backlogs are substantial, but uneven due to price competition. Demand is expected to hold through the balance of the year for highway structures and schools. Expansion of educational facilities will carry through 1961. Most designs are for reinforced concrete structures.

Tubular Goods . . .

Tubular Goods Prices, Page 135

Although they welcome any improvement, pipe producers concede that recent gains have been small. Bookings for buttweld pipe and miscellaneous line pipe were somewhat better last month than they were in June. The flurry in buttweld probably reflected the recent change in distributor discounts. They've been increased from 3 to 5 per cent so that sellers will have more incentive to promote the domestic product in the face of foreign competition.

Demand for oil country goods remains sluggish, but inventories are no longer so unwieldy. Although total stocks are high, users are running short of certain grades and sizes. By November, they're expected to complete their inventory adjustments and come back into the market for sizable tonnages. Producers hope for moderate improvement over the next few months. Bookings in August should surpass last month's with ease. July entries were at the lowest level of the year.

Hughes Tool Co. reports 1730 rotary rigs were drilling for oil in this country during the week ended July 30, an increase of 20 over the previous week's figure. In Canada, the number of operating rigs rose from 143 to 173. Combined U. S. and Canadian operations totaled 1904, a gain of 50 for the week.

Westcoast Transmission Co. Ltd. will begin construction of a 250 mile, 30 in. pipeline into the Ft. Nelson area of northeastern British Columbia next spring with com-

pletion scheduled for the late fall of 1961.

Distributors . . .

Prices, Page 136

Steel service centers anticipate a slight pickup in business this month but see no appreciable gain until after Labor Day. Mass vacations at many metalworking shops this month will cut into consumption of steel. In addition, users of steel will limit purchases because practically all products are available for delivery on short notice.

Distributors have large, well balanced stocks. In some sections, especially on the Gulf and West Coasts, stocks are unusually heavy because foreign competition has hampered the movement of domestic material.

Stainless Steel . . .

Stainless Steel Prices, Page 135

Production of stainless and heat resisting steel ingots (excluding all tool steel grades) declined to 210,400 tons in the second quarter from 386,786 tons in the first, says the American Iron & Steel Institute. The total for the first six months is 597,186 tons compared with 739,764 tons in the like period a year ago.

Stauffer Sets Quantity Prices on Two Compounds

Stauffer Chemical Co., New York, is producing columbium pentachloride and tantalum pentachloride in commercial quantities and has established spot price schedules, f.o.b. Richmond, Calif.:

Tantalum Pentachloride:

	Per lb
2000 lb & over	$10.00*
Less than 2000 lb ...	10.25*
Smaller quantities	11.00-15.00

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2000 lb & over	5.00†
Less than 2000 lb ...	5.25†
Smaller quantities	6.00-10.00

*In 260 lb containers. †In 150 lb containers.

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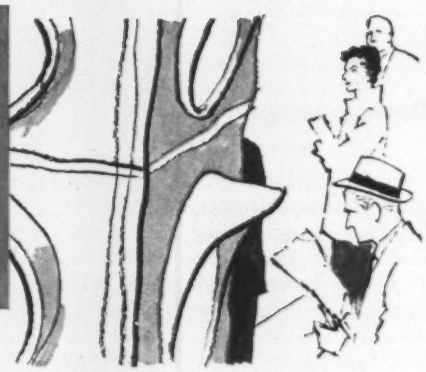
"How do you feel Savings Bonds match up against common stocks as an employee investment?"



"You really can't compare the two, Jimmy! As you know so well, every good investment plan needs a sound backlog of basic safety and you need some savings before you branch out with anything else. Now, we don't know of ANY sounder, safer form of saving than U.S. Savings Bonds. We felt we were doing our people a real favor by asking our State Savings Bond Director to help us explain the Payroll Savings Plan to every person on our payroll.

"Until we put on this company-wide campaign, lots of people in our company had no idea they could set up a regular, *automatic* savings plan by just signing one card. They welcomed having someone to answer their question *in person*, and it appealed to their pride to be made a part of the company group contributing to our country's economic welfare.

"And, Jimmy, here was another thing we found out. Many of our employees didn't realize that since U.S. Savings Bonds now earn 3¾% they are the best investment they have EVER been!"

Perhaps there are employees in *your* organization who don't know what a splendid base for family savings U.S. Savings Bonds really are. Perhaps they don't realize how easy it is to start NEXT PAYDAY with regular, systematic savings for important future goals.

Your State Savings Bonds Director has a fine background of experience in presenting the Payroll Savings Plan. For fast, understanding help, get in touch with him now. Or write Savings Bonds Division, U.S. Treasury Department, Washington, D. C.

NOW! U. S. SAVINGS BONDS EARN 3¾%

STEEL
The Metalworking Weekly

THE U. S. GOVERNMENT DOES NOT PAY FOR THIS ADVERTISEMENT. THE TREASURY DEPARTMENT THANKS, FOR THEIR PATRIOTISM, THE ADVERTISING COUNCIL AND THE DONOR ABOVE.

large quantities on annual contract. Purity of the commercial compounds is above 99.5%.

Steel Export Rate Holds

Steel exports from the port of Philadelphia totaled about 36,200 tons in June and are estimated at the same figure for July. The movement is expected to maintain an active pace through August and possibly beyond. Most of the export tonnage is for Japan, although a fair amount is going to Europe.

Container Shipments Rise

Shipments of steel shipping barrels and drums in May totaled 2,741,107 units, up 10 per cent from the 2,483,397 units shipped in April, and down 21 per cent from the 3,458,321 units moved in May, 1959, reports the U. S. Bureau of the Census. Shipments during the first five months of this year totaled 12,437,059 units against 14,575,524 units in the like period a year ago.

Shipments of 6,609,606 steel pails in May were 12 per cent above the April shipments of 5,894,302, and 18 per cent below the May, 1959, total of 8,214,207 units. Shipments during the first five months totaled 28,643,379 units compared with 33,066,130 units in the same period of 1959.

Rails, Cars . . .

Track Material Prices, Page 134

Freight car awards in June totaled 321 units, down from 2234 in May, reports the American Railway Car Institute and the Association of American Railroads.

The trend in deliveries was up—6042 freight cars in June compared with 5931 in May.

Backlogs as of July 1 showed 15,421 cars on order in railroad shops and 14,134 in commercial shops. Total: 29,555 compared with 36,106 on June 1.

Canada . . .

The Canadian steel industry had the best first half in its history. Mills operated at an average of 92.2 per cent of rated ingot capacity, pouring a record 3,121,593 tons, says the Financial Council. The increase: 345,346 tons, or 12.4 per cent above the record established a year ago.

Although production slackened in the second quarter, steel furnaces operated at 85.3 per cent and turned out 1,428,799 tons of ingots.

Plates . . .

Plate Prices, Page 131

Disappointed by business prospects, most plate buyers are trimming their inventories to a level in keeping with their reduced rates of consumption.

An electrical apparatus manufacturer in the Pittsburgh area has decided to carry 20 per cent less steel than it has been stocking in recent months. Although it has completed its adjustments on some commodities, the firm still has a lot of cutting to do on tonnage items. "We won't be down to our target level on plates until September or October," a buyer declares.

Slow sales to utilities are partly responsible for the steel inventory cutbacks. Business had been expected to improve steadily in the next two years, hitting a peak in 1963. Now it looks like the peak won't come until 1965. Despite their projections of vastly increased power requirements, utilities are buying little new equipment. The few scattered orders being placed now are for 1962 delivery.

Plate specialties are moving better than carbon material, due largely to submarine work and missile tank requirements. Requirements for merchant ships, line pipe, and railroads are spotty.

Tank, boiler, and bridge requirements are slow in New England. For Naval shipyards in that district, heavier buying is expected in the fourth quarter. Naval shipyards in the district are expected to place few orders during the current quarter and somewhat heavier tonnages in the final three months of the year.

Plate deliveries from Pittsburgh mills average two to three weeks. In Chicago, they are down to one to two weeks. In the Eastern Pennsylvania area, sheared plate deliv-

800 to 1 hp favorites for quiet operation, low maintenance and long-life service . . .

From the case of the A. O. Smith Motor Man — a complete stable of integrals that include single-phase models (1-5 hp) or polyphase (1-800 hp). Also a team of fractional-hp motors. All are sure bets to give top performance over the long, long haul.

And there's an A. O. Smith Motor Man near you — chomping at the bit to give you 24-hour action on all parts and service orders.

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A. O. SMITH INTERNATIONAL, S.A.
Milwaukee 1, Wisconsin, U.S.A.

eries range from ten days to three weeks.

Offers Beryllium Tubing

Pure beryllium tubing has been made available in the U. S. by Superior Tube Co., Norristown, Pa., under the terms of a technical exchange agreement with Chesterfield Tube Co., Chesterfield, England. The engineering material has promising applications in nuclear reactors and aircraft and missiles.

Structural Shapes . . .

Structural Shape Prices, Page 131

Unless there's a spurt in buying later in the month, August won't be as good a month as July for structurals. Wide flange beam producers maintained fairly high operations in July by working off their order backlogs. Now the backlogs are practically depleted, and new orders are scarce. Rolling schedules in August probably won't exceed 60 per cent of capacity.

Since service centers and fabricators have big inventories and aren't consuming them rapidly, there's little hope for an upturn until September or October. Almost all the steel that is being sold now is for jobs. Roadbuilding and bridge work are mainstays of the market. Many plant expansion programs have apparently been shelved.

The outlook for standard structurals is poor, principally because of the lack of demand from railroad carbuilders. Officials of some producing firms say the structural steel capacity won't be taxed for years. Only when wide flange beams are hard to get will demand for standard structurals be strong, they say.

Bidding on structural work was more active last week and prices of fabricated work appear to be a shade stronger. It is still considered a "buyers' market," however.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

350 tons, home for the aged, Danville, Pa., through John McShain, Philadelphia, to Anthracite Bridge Co., Scranton, Pa.

STRUCTURAL STEEL PENDING

6000 tons, 13 story office building, New York Life Insurance Co., Madison Avenue, between 27th and 28th Streets, New York; bids closed July 15; was previously noted as involving 4000 tons.

4580 tons, state suspension bridge, LR 113, Section 19D and 20D, Washington-Fayette Counties, Pennsylvania; Pittsburgh - Des Moines Steel Co., Pittsburgh, low bidder.

2800 tons, housing development for New York City Housing Authority, West Brighton, N. Y.; bids closed Aug. 2. This project has been up for bidding before, but involved a larger program.

2300 tons, executive offices, American Cyanamid Co., Wayne, N. J.; bids asked.

1000 tons, estimated, building, Leaf Div., P. Lorillard Co., Danville, Va.; bids closed July 15; of total, approximately 300 tons represent structural shapes and 700 tons bar joists.

707 tons, state bridgework, LR 1011, Section 3, Berks County, Pennsylvania; James D. Morrissey, Philadelphia, low on general contract. An alternate involves either 186 tons of shapes or prestressed construction.

550 tons, Public School No. 84, Manhattan, New York; bids closed Aug. 4.

550 tons, Public School No. 257, Brooklyn, New York; bids closed Aug. 4.

542 tons, state bridgework, LR 471, Section 9, Northampton-Carbon Counties, Pennsylvania; J. Rober Bazley, Pottsville, Pa., low on general contract. Also required: 4200 sq ft of 5 in. open type grid flooring.

422 tons, state bridgework, LR 774, Section 1, Cumberland County, Pennsylvania; Hempt Bros. Inc., Camp Hill, Pa., low on general contract. Also required: Either 230 tons of shapes or a prestressed alternate.

400 tons, municipal House of Detention, Bronx, New York, N. Y.; bids asked.

153 tons, state bridgework, LR 66034, Section 1, York County, Pennsylvania; H. J. Williams, York, Pa., low on general contract.

114 tons, state bridgework, LR 798, Section 2, Washington County, Pennsylvania; Latrobe Road Construction Inc., Latrobe, Pa., low on general contract. Also required: 300 tons of prestressed work with a structural steel alternate.

REINFORCING BARS . . .

REINFORCING BARS PLACED

580 tons, Mariott Motor Hotel, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

375 tons, public school, Philadelphia, to American Steel Engineering Co., that city.

100 tons, home for aged, Danville, Pa., through John McShain, Philadelphia, general contractor, to Sweet's Steel Co., Williamsport, Pa.

REINFORCING BARS PENDING

1620 tons, Roanoke Street section of Seattle freeway; Puget Sound Bridge & Drydock Co., Seattle, apparently low at $3.1 million to Washington state.

1050 tons, Federal Social Security Building, Baltimore; bids closed.

500 tons or more, 22 story Hilton Hotel, Portland, Oreg.; Andersen-Westfall Co., Portland, low base at $6,026,084.

235 tons, two spans on 3.9 mile freeway, Pierce County, Washington; John P. Hopkins Co., Mercer Island, Washington, apparently low at $2,360,729 to Washington state.

175 tons, Washington state road project, Okanogan and Grant counties; Crick & Sons, Yardley, Wash., apparently low at $1,042,278.

Unstated, six story science building, Washington State University, Pullman, Wash.; Henry George & Sons, Spokane, Wash., low at $1,004,870.

PLATES . . .

PLATES PLACED

1725 tons, medium black, Naval shipyard, Philadelphia, to Phoenix Steel Corp., Harrisburg, Pa.

600 tons, Oregon state highway projects, two pipe girder bridges, Williamette River and Tuatlin River, Oregon, to United Concrete Pipe Co., Auburn, Wash.

RAILS, CARS . . .

RAILROAD CARS PLACED

Louisville & Nashville, 3000 fifty ton hopper cars to be rebuilt in company shops.

Canadian National, 80 narrow gage flat cars, to Eastern Car Div., Dominion Steel Corp., Trenton, N. S.

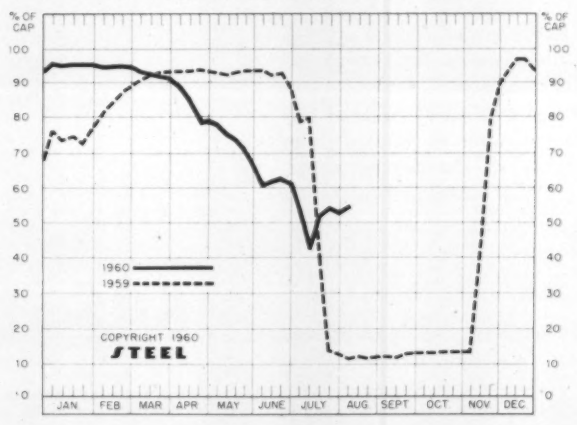
DISTRICT INGOT RATES

(Percentage of capacity utilized)

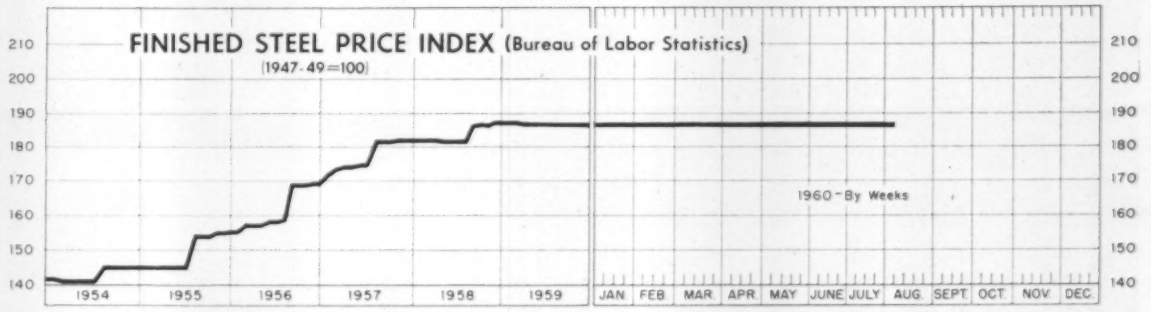
	Week Ended Aug. 7	Week Ago	Month Ago	Year Ago
Northeastern	61	61	50	*
Buffalo	57	56	48	*
Pittsburgh	50	49	35	*
Youngstown	47	48	13	*
Cleveland	50	32	42	*
Detroit	79	80	70	*
Chicago	57	56	46	*
Cincinnati	52	48	26	*
St. Louis	54	41	52	*
Southern	61	62	42	*
Western	49	51	64	*
Total Industry	55.1	53.3	42.2	11.2
Index (1947-49=100)	97.7	94.6	74.9	19.8
Net Tons (In Thousands)	1,570	1,520	1,203	318

Current week's figures are preliminary. Weekly capacity (net tons): 2,849,306 in 1960 and 2,831,331 in 1959. Source: American Iron & Steel Institute. *Not available due to general strike.

NATIONAL STEELWORKS OPERATIONS



Price Indexes and Composites



Aug. 2, 1960	Week Ago	Month Ago	July Index	Year Ago
186.2	186.2	186.2	186.2	187.7

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Aug. 2

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard No. 1	$5.825	Bars, Reinforcing	6.385
Rails, Light, 40 lb	7.292	Bars, C.F., Carbon	10.710
Tie Plates	6.875	Bars, C.F., Alloy	14.125
Axles, Railway	10.175	Bars, C.F., Stainless, 302 (lb)	0.570
Wheels, Freight Car, 33 in. (per wheel)	62.000	Sheets, H.R., Carbon	6.350
Plates, Carbon	6.350	Sheets, C.R., Carbon	7.300
Structural Shapes	6.167	Sheets, Galvanized	8.775
Bars, Tool Steel, Carbon (lb)	0.560	Sheets, C.R., Stainless, 302 (lb)	0.658
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.680	Sheets, Electrical	12.625
Bars, Tool Steel, H.R. Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.060 (lb)	1.400	Strip, C.R., Carbon	9.489
Bars, Tool Steel, H.R. Alloys, High Speed, W18 Cr 4, V 1 (lb)	1.895	Strip, C.R., Stainless, 430 (lb)	0.480
Bars, H.R., Alloy	10.775	Strip, H.R., Carbon	6.250
Bars, H.R., Stainless, 303 (lb)	0.543	Pipe, Black, Buttweld (100 ft)	19.495
Bars, H.R., Carbon	6.675	Pipe, Galv., Buttweld (100 ft)	23.430
		Pipe, Line (100 ft)	195.433
		Casing, Oil Well, Carbon (100 ft)	201.080
		Casing, Oil Well, Alloy (100 ft)	315.213
		Tubes, Boiler (100 ft)	51.200
		Tubing, Mechanical, Carbon (100 ft)	27.005
		Tubing, Mechanical, Stainless, 304 (100 ft)	195.395
		Tin plate, Hot-dipped, 1.25 lb (95 lb base box)	10.100
		Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.800
		Black Plate, Canmaking Quality (95 lb base box)	7.900
		Wire, Drawn, Carbon	10.575
		Wire, Drawn, Stainless, 430 (lb)	0.665
		Bale Ties (bundles)	7.647
		Nails, Wire, 8d Common	9.433
		Wire, Barbed (80-rod spool)	8.414
		Woven Wire Fence (20-rod roll)	21.003

STEEL's FINISHED PRICE INDEX*

	Aug. 3 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	247.82	247.82	247.82	247.82	207.63
Index in cents per lb	6.713	6.713	6.713	6.713	5.625

STEEL's ARITHMETICAL PRICE COMPOSITES*

Finished Steel, NT	$149.96	$149.96	$149.96	$149.96	$127.41
No. 2 Fdry, Pig Iron, GT	66.49	66.49	66.49	66.49	58.99
Basic Pig Iron, GT	65.99	65.99	65.99	65.99	58.49
Malleable Pig Iron, GT	67.27	67.27	67.27	67.27	59.77
Steelmaking Scrap, GT	32.00	31.83	31.33	38.33	43.17

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Aug. 3 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.675	5.675	5.675	5.675	4.65
Bars, H.R., Chicago	5.675	5.675	5.675	5.675	4.65
Bars, H.R., deld., Philadelphia	5.975	5.975	5.975	5.975	4.90
Bars, C.R., Pittsburgh	7.65*	7.65*	7.65*	7.65*	5.90
Shapes, Std., Pittsburgh	5.50	5.50	5.50	5.50	4.60
Shapes, Std., Chicago	5.50	5.50	5.50	5.50	4.60
Shapes, deld., Philadelphia	5.77	5.77	5.77	5.77	4.88
Plates, Pittsburgh	5.30	5.30	5.30	5.30	4.50
Plates, Chicago	5.30	5.30	5.30	5.30	4.50
Plates, Coatesville, Pa.	5.30	5.30	5.30	5.30	4.50
Plates, Sparrows Point, Md.	5.30	5.30	5.30	5.30	4.50
Plates, Claymont, Del.	5.30	5.30	5.30	5.30	4.50
Sheets, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Sheets, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Sheets, C.R., Pittsburgh	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Chicago	6.275	6.275	6.275	6.275	5.325
Sheets, C.R., Detroit	6.275	6.275	6.275	6.275	5.325-5.425
Sheets, Galv., Pittsburgh	6.875	6.875	6.875	6.875	5.85
Strip, H.R., Pittsburgh	5.10	5.10	5.10	5.10	4.325
Strip, H.R., Chicago	5.10	5.10	5.10	5.10	4.325
Strip, C.R., Pittsburgh	7.425	7.425	7.425	7.425	6.317
Strip, C.R., Chicago	7.425	7.425	7.425	7.425	6.35-6.45
Strip, C.R., Detroit	7.425	7.425	7.425	7.425	6.35
Wire, Basic, Pittsburgh	8.00	8.00	8.00	8.00	6.25
Nails, Wire, nonstock, Pitts.	8.95	8.95	8.95	8.95	7.60
Tin plate (1.50 lb) box, Pitts.	$10.65	$10.65	$10.65	$10.65	$9.05

*Including 0.35c for special quality.

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$99.50	$99.50	$99.50	$99.50	$84.50
Wire rods, 7/32-5/8" Pitts.	6.40	6.40	6.40	6.40	5.025

PIG IRON, Gross Ton

	Aug. 3 1960	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pittsburgh	$67.00	$67.00	$67.00	$67.00	$59.50
Basic, Valley	66.00	66.00	66.00	66.00	58.50
Basic, deld., Philadelphia	70.41	70.41	70.41	70.41	56.16
No. 2 Fdry, Neville Island, Pa.	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, Chicago	66.50	66.50	66.50	66.50	59.00
No. 2 Fdry, deld., Phila.	70.91	70.91	70.91	70.91	59.66
No. 2 Fdry, Birmingham	62.50	62.50	62.50	62.50	55.00
No. 2 Fdry (Birm.), deld., Cin.	70.20	70.20	70.20	70.20	62.70
Malleable, Valley	66.50	66.50	66.50	66.50	59.00
Malleable, Chicago	66.50	66.50	66.50	66.50	59.00
Ferromanganese, net tons†	245.00	245.00	245.00	245.00	190.00

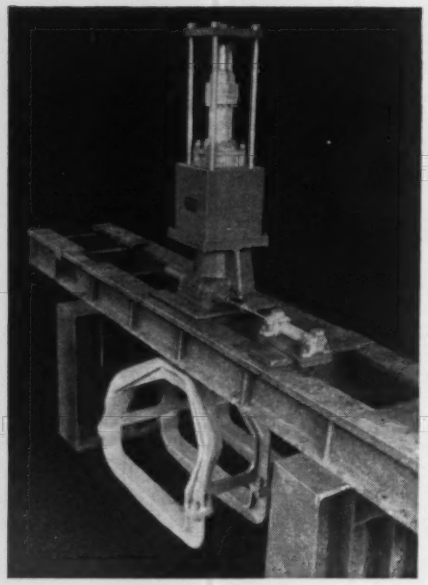
†74-76% Mn, Duquesne, Pa.

SCRAP, Gross Ton (Including broker's commission)

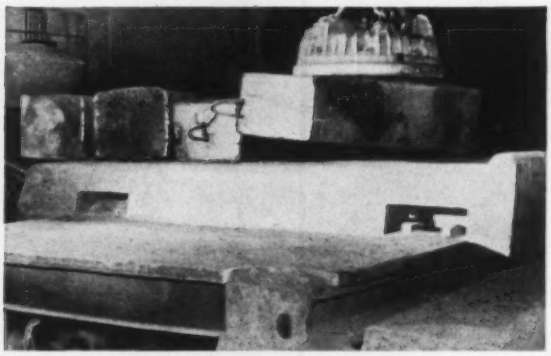
No. 1 Heavy Melt, Pittsburgh	$30.50	$30.50	$30.50	$38.50	$43.00
No. 1 Heavy Melt, E. Pa.	34.00	34.00	34.00	40.00	44.50
No. 1 Heavy Melt, Chicago	31.50	31.00	29.50	36.50	42.00
No. 1 Heavy Melt, Valley	33.50	33.50	32.50	41.50	46.50
No. 1 Heavy Melt, Cleve.	31.50	31.50	31.50	38.50	44.00
No. 1 Heavy Melt, Buffalo	29.50	29.50	29.50	33.50	39.50
Rails, Rerolling, Chicago	52.50	51.50	49.50	59.50	64.50
No. 1 Cast, Chicago	42.50	40.50	40.50	52.50	45.50

COKE, Net Ton

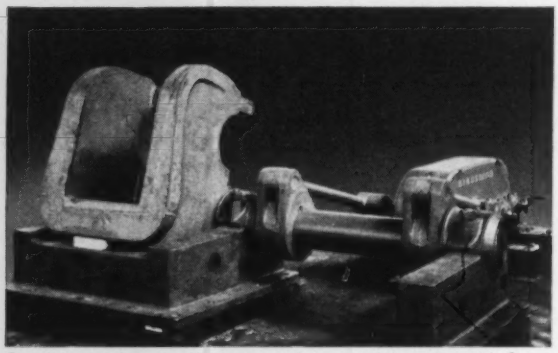
Beehive, Furn., Connisvl.	$15.00	$15.00	$15.00	$15.00	$13.75
Beehive, Fdry., Connisvl.	18.25	18.25	18.25	18.25	16.75
Oven, Fdry., Milwaukee	32.00	32.00	32.00	32.00	26.25



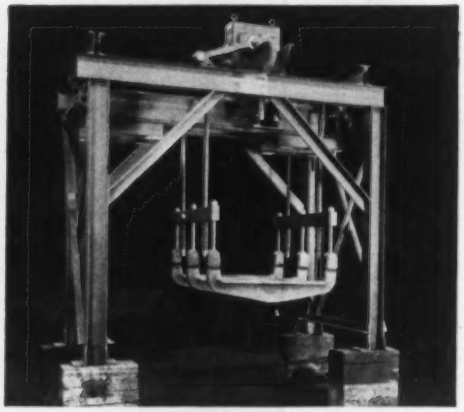
Ingot Turn-about arranged for mounting over mill approach table.



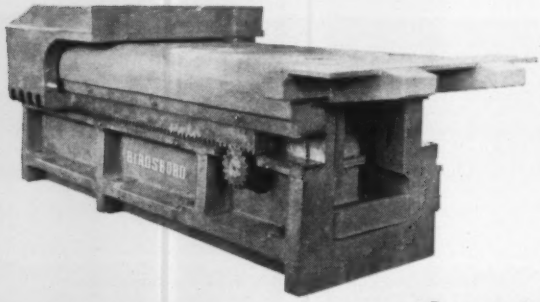
Ingot feeder bed and chain conveyor, receives ingots from crane and feeds up slope to ingot furnace charging table and pushers.



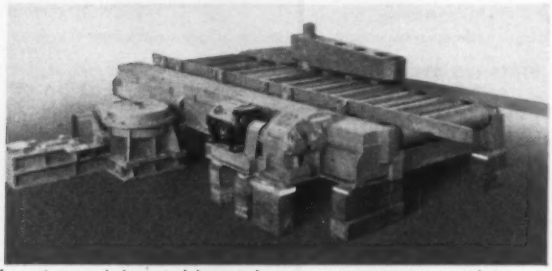
Stationary ingot tilting pot for receiving ingots from crane and laying them on mill approach table.



Ingot weighing scale arranged for mounting over mill approach table.



Ingot pusher to mill approach table arranged to receive ingots from pit crane.



Ingot receiving table and sweep arm arranged to receive ingots from tilting pot buggy and to place them either end first on mill approach table.

Ingot Weighing and Handling Equipment by MM 87-60

BIRDSBORO

CORPORATION

STEEL MILL MACHINERY • HYDRAULIC PRESSES • CRUSHING MACHINERY • SPECIAL MACHINERY • ROLLS
ELECTRIC STEEL CASTINGS: Carbon, Low Alloy and STAINLESS STEEL • BIRDSBORO, PENNSYLVANIA

Steel Prices

Mill prices as reported to STEEL, Aug. 3, cents per pound except as otherwise noted. *Changes shown in italics.* Code number following mill point indicates producing company. Key to producers, page 132; footnotes, page 134.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)
Munhall,Pa. U5 ....$76.00

INGOTS, Alloy (NT)
Detroit S41 ....$82.00
Economy,Pa. B14 ....82.00
Farrell,Pa. S3 ....82.00
Lowellville,O. S3 ....82.00
Midland,Pa. C18 ....82.00
Munhall,Pa. U5 ....82.00
Sharon,Pa. S3 ....82.00

BILLETS, BLOOMS & SLABS
Carbon Rerolling (NT)
Bartonville,Ill. K4 ....$82.00
Bessemer,Pa. U5 ....80.00
Buffalo R2 ....80.00
Clairton,Pa. U5 ....80.00
Ensley,Ala. T2 ....80.00
Fairfield,Ala. T2 ....80.00
Fontana,Calif. K1 ....90.50
Gary,Ind. U5 ....80.00
Johnstown,Pa. B2 ....80.00
Lackawanna,N.Y. B2 ..80.00
Munhall,Pa. U5 ....80.00
Owensboro,Ky. G8 ....80.00
S.Chicago,Ill. R2, U5 ..80.00
S.Duquesne,Pa. U5 ....80.00
Sterling,Ill. N15 ....80.00
Youngstown R2 ....80.00

Carbon, Forging (NT)
Bessemer,Pa. U5 ....$99.50
Buffalo R2 ....99.50
Canton,O. R2 ....102.00
Clairton,Pa. U5 ....99.50
Conshohocken,Pa. A3 ..104.50
Ensley,Ala. T2 ....99.50
Fairfield,Ala. T2 ....99.50
Farrell,Pa. S3 ....99.50
Fontana,Calif. K1 ....109.00
Gary,Ind. U5 ....99.50
Geneva,Utah C11 ....99.50
Houston S5 ....104.50
Johnstown,Pa. B2 ....99.50
Lackawanna,N.Y. B2 ..99.50
LosAngeles B3 ....109.00
Midland,Pa. C18 ....99.50
Munhall,Pa. U5 ....99.50
Owensboro,Ky. G8 ....99.50
Seattle B3 ....109.00
Sharon,Pa. S3 ....99.50
S.Chicago R2, U5, W14 ..99.50
S.Duquesne,Pa. U5 ....99.50
S.SanFrancisco B3 ....109.00
Warren,O. C17 ....99.50

Alloy, Forging (NT)
Bethlehem,Pa. B2 ..$119.00
Bridgeport,Conn. C32 ..119.00
Buffalo R2 ....119.00
Canton,O. R2, T7 ....119.00
Conshohocken,Pa. A3 ..126.00
Detroit S41 ....119.00
Economy,Pa. B14 ....119.00
Farrell,Pa. S3 ....119.00
Fontana,Calif. K1 ....140.00
Gary,Ind. U5 ....119.00
Houston S5 ....124.00
Ind.Harbor,Ind. Y1 ....119.00
Johnstown,Pa. B2 ....119.00
Lackawanna,N.Y. B2..119.00
LosAngeles B3 ....139.00
Lowellville,O. S3 ....119.00
Massillon,O. R2 ....119.00
Midland,Pa. C18 ....119.00
Munhall,Pa. U5 ....119.00
Owensboro,Ky. G8 ..119.00
Sharon,Pa. S3 ....119.00
S.Chicago R2,U5,W14..119.00
S.Duquesne,Pa. U5 ....119.00
Struthers,O. Y1 ....119.00
Warren,O. C17 ....119.00

ROUNDS, SEAMLESS TUBE (NT)
Buffalo R2 ....$122.50
Canton,O. R2 ....125.00
Cleveland R2 ....122.50
Gary,Ind. U5 ....122.50
S.Chicago,Ill. R2,W14 122.50
S.Duquesne,Pa. U5 ...122.50
Warren,O. C17 ....122.50

SKELP
Aliquippa,Pa. J5 ....5.05
Benwood,W.Va. W10 ....5.05
Ind.Harbor,Ind. Y1 ....5.05
Munhall,Pa. U5 ....5.05
Pittsburgh J5 ....5.05
Warren,O. R2 ....5.05
Youngstown R2, U5 ....5.05

WIRE RODS
AlabamaCity,Ala. R2 ..6.40
Aliquippa,Pa. J5 ....6.40
Alton,Ill. L1 ....6.60
Bartonville,Ill. K4 ....6.50
Buffalo W12 ....6.40
Cleveland A7 ....6.40
Donora,Pa. A7 ....6.40
Fairfield,Ala. T2 ....6.40
Houston S5 ....6.65
IndianaHarbor,Ind. Y1 ..6.40
Johnstown,Pa. B2 ....6.40
Joliet,Ill. A7 ....6.40
KansasCity,Mo. S5 ....6.65
Kokomo,Ind. C16 ....6.50
LosAngeles B3 ....7.20
Minnequa,Colo. C10 ....6.65
Monessen,Pa. P7 ....6.40
Pittsburg,Calif. C11 ...7.20
Portsmouth,O. P12 ....6.40
Roebling,N.J. R5 ....6.50
S.Chicago,Ill. R2, W14..6.40
SparrowsPoint,Md. B2 ..6.50
Sterling,Ill.(1) N15 ....6.40
Sterling,Ill. N15 ....6.50
Struthers,O. Y1 ....6.40
Worcester,Mass. A7 ....6.70

STRUCTURALS

Carbon Steel Std. Shapes
AlabamaCity,Ala. R2 ...5.50
Aliquippa,Pa. J5 ....5.50
Atlanta A11 ....5.70
Bessemer,Ala. T2 ....5.50
Bethlehem,Pa. B2 ....5.55
Birmingham C15 ....5.50
Clairton,Pa. U5 ....5.50
Fairfield,Ala. T2 ....5.50
Fontana,Calif. K1 ....6.30
Gary,Ind. U5 ....5.50
Geneva,Utah C11 ....5.50
Houston S5 ....5.60
Ind.Harbor,Ind. I-2, Y1..5.50
Johnstown,Pa. B2 ....5.55
Joliet,Ill. P22 ....5.50
KansasCity,Mo. S5 ....5.60
Lackawanna,N.Y. B2 ..5.55
LosAngeles B3 ....6.20
Minnequa,Colo. C10 ....5.80
Munhall,Pa. U5 ....5.50
Niles,Calif. P1 ....6.25
Phoenixville,Pa. P4 ....5.55
Portland,Oreg. O4 ....6.25
Seattle B3 ....6.25
S.Chicago,Ill. U5, W14 ..5.50
S.SanFrancisco B3 ....6.15
Sterling,Ill. N15 ....5.50
Torrance,Calif. C11 ....6.20
Weirton,W.Va. W6 ....5.50

Wide Flange
Bethlehem,Pa. B2 ....5.55
Clairton,Pa. U5 ....5.50
Fontana,Calif. K1 ....6.45
IndianaHarbor,Ind. I-2 ..5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 ....5.50
Phoenixville,Pa. P4 ....5.55
S.Chicago,Ill. U5 ....5.50
Sterling,Ill. N15 ....5.50
Weirton,W.Va. W6 ....5.50

Alloy Std. Shapes
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....6.90
Munhall,Pa. U5 ....6.80
S.Chicago,Ill. U5, W14..6.80

H.S., L.A., Std. Shapes
Aliquippa,Pa. J5 ....8.05
Bessemer,Ala. T2 ....8.05
Bethlehem,Pa. B2 ....8.10
Clairton,Pa. U5 ....8.05
Fairfield,Ala. T2 ....8.05
Fontana,Calif. K1 ....8.85
Gary,Ind. U5 ....8.05
Geneva,Utah C11 ....8.05
Houston S5 ....8.15
Ind.Harbor,Ind. I-2, Y1..8.05
Johnstown,Pa. B2 ....8.10
KansasCity,Mo. S5 ....8.15
Lackawanna,N.Y. B2 ..8.10
LosAngeles B3 ....8.75
Munhall,Pa. U5 ....8.05
Seattle B3 ....8.80
S.Chicago,Ill. U5, W14..8.05
S.SanFrancisco B3 ....8.70
Sterling,Ill. N15 ....7.75
Struthers,O. Y1 ....8.05

H.S., L.A., Wide Flange
Bethlehem,Pa. B2 ....8.10
Ind.Harbor,Ind. I-2 ....8.05
Lackawanna,N.Y. B2 ..8.10
Munhall,Pa. U5 ....8.05
S.Chicago,Ill. U5 ....8.05
Sterling,Ill. N15 ....7.75

PILING

BEARING PILES
Bethlehem,Pa. B2 ....5.55
Ind.Harbor,Ind. I-2 ....5.50
Lackawanna,N.Y. B2 ...5.55
Munhall,Pa. U5 ....5.50
S.Chicago,Ill. I-2, U5 ..5.50

STEEL SHEET PILING
Ind.Harbor,Ind. I-2 ....6.50
Lackawanna,N.Y. B2 ...6.50
Munhall,Pa. U5 ....6.50
S.Chicago,Ill. I-2, U5 ...6.50
Weirton,W.Va. W6 ....6.50

PLATES

PLATES, Carbon Steel
AlabamaCity,Ala. R2 ..5.30
Aliquippa,Pa. J5 ....5.30
Ashland,Ky.(15) A10 ...5.30
Atlanta A11 ....5.50
Bessemer,Ala. T2 ....5.30
Clairton,Pa. U5 ....5.30
Claymont,Del. C22 ....5.30
Cleveland J5, R2 ....5.30
Coatesville,Pa. L7 ....5.30
Conshohocken,Pa. A3 ..5.30
Ecorse,Mich. G5 ....5.30
Fairfield,Ala. T2 ....5.30
Farrell,Pa. S3 ....5.30
Fontana,Calif.(30) K1 ..6.10
Gary,Ind. U5 ....5.30
Geneva,Utah C11 ....5.30
GraniteCity,Ill. G4 ....5.40
Harrisburg,Pa. P4 ....5.30
Houston S5 ....5.40
Ind.Harbor,Ind. I-2, Y1..5.30
Johnstown,Pa. B2 ....5.30
Lackawanna,N.Y. B2 ..5.30
Mansfield,O. E6 ....5.30
Minnequa,Colo. C10 ....6.15
Munhall,Pa. U5 ....5.30
Newport,Ky. A2 ....5.30
Pittsburgh J5 ....5.30
Riverdale,Ill. A1 ....5.30
Seattle B3 ....6.20
Sharon,Pa. S3 ....5.30
S.Chicago,Ill. U5, W14 ..5.30
SparrowsPoint,Md. B2 ..5.30
Sterling,Ill. N15 ....5.30
Steubenville,O. W10 ....5.30
Warren,O. R2 ....5.30
Youngstown U5, Y1 ....5.30
Youngstown(27) R2 ....5.30

PLATES, Carbon Abras. Resist.
Claymont,Del. C22 ....7.05
Fontana,Calif. K1 ....7.85
Geneva,Utah C11 ....7.05
Houston S5 ....7.15
Johnstown,Pa. B2 ....7.05
SparrowsPoint,Md. B2 ..7.05

PLATES, Wrought Iron
Economy,Pa. B14 ....14.10

PLATES, H.S., L.A.
Aliquippa,Pa. J5 ....7.95
Ashland,Ky. A10 ....7.95
Bessemer,Ala. T2 ....7.95
Clairton,Pa. U5 ....7.95
Claymont,Del. C22 ....7.95
Cleveland J5, R2 ....7.95
Coatesville,Pa. L7 ....7.95
Conshohocken,Pa. A3 ..7.95
Economy,Pa. B14 ....7.95
Ecorse,Mich. G5 ....7.95
Fairfield,Ala. T2 ....7.95
Farrell,Pa. S3 ....7.95
Fontana,Calif.(30) K1 ..8.75
Gary,Ind. U5 ....7.95
Geneva,Utah C11 ....7.95
Houston S5 ....8.05
Ind.Harbor,Ind. I-2, Y1..7.95
Johnstown,Pa. B2 ....7.95
Munhall,Pa. U5 ....7.95
Pittsburgh J5 ....7.95
Seattle B3 ....8.85
Sharon,Pa. S3 ....7.95
S.Chicago,Ill. U5, W14..7.95
SparrowsPoint,Md. B2 ..7.95
Sterling,Ill. N15 ....7.625
Warren,O. R2 ....7.95
Youngstown U5, Y1 ....7.95

PLATES, Alloy
Aliquippa,Pa. J5 ....7.50
Claymont,Del. C22 ....7.50
Coatesville,Pa. L7 ....7.50
Economy,Pa. B14 ....7.50
Farrell,Pa. S3 ....7.50
Fontana,Calif. K1 ....8.30
Gary,Ind. U5 ....7.50
Houston S5 ....7.60
Ind.Harbor,Ind. Y1 ....7.50
Johnstown,Pa. B2 ....7.50
Lowellville,O. S3 ....7.50
Munhall,Pa. U5 ....7.50
Newport,Ky. A2 ....7.50
Pittsburgh J5 ....7.50
Seattle B3 ....8.40
Sharon,Pa. S3 ....7.50
S.Chicago,Ill. U5, W14..7.50
SparrowsPoint,Md. B2 ..7.50
Youngstown Y1 ....7.50

FLOOR PLATES
Cleveland J5 ....6.375
Conshohocken,Pa. A3 ..6.375
Ind.Harbor,Ind. I-2 ..6.375
Munhall,Pa. U5 ....6.375
Pittsburgh J5 ....6.375
S.Chicago,Ill. U5 ....6.375

PLATES, Ingot Iron
Ashland c.l.(15) A10 ...5.55
Ashland l.c.l.(15) A10 ..6.05
Cleveland c.l. R2 ....6.05
Warren,O. R2 ....6.05

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)
Ala.City,Ala.(9) R2 ...5.675
Aliquippa,Pa.(9) J5 ...5.675
Alton,Ill. L1 ....5.875
Atlanta(9) A11 ....5.875
Bessemer,Ala.(9) T2 ...5.675
Birmingham(9) C15 ...5.675
Buffalo(9) R2 ....5.675
Canton,O.(23) R2 ....6.15
Clairton,Pa.(9) U5 ...5.675
Cleveland(9) R2 ....5.675
Ecorse,Mich.(9) G5 ...5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala.(9) T2 ...5.675
Fairless,Pa.(9) U5 ....5.825
Fontana,Calif.(9) K1 ..6.375
Gary,Ind.(9) U5 ....5.675
Houston(9) S5 ....5.925
Ind.Harbor(9) I-2, Y1..5.675
Johnstown,Pa.(9) B2 ..5.675
Joliet,Ill. P2 5675
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
LosAngeles(9) B3 ....6.375
Massillon,O.(23) R2 ....6.15
Midland,Pa.(23) C18 ..6.025
Milton,Pa. M18 ....5.825
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Owensboro,Ky.(9) G8 ..6.025
Pittsburg,Calif.(9) C11.6.375
Pittsburgh(9) J5 ....5.675
Portland,Oreg. O4 ....6.425
Riverdale,Ill.(9) A1 ...5.675
Seattle(9) A24,B3,N15 .6.425
S.Ch'c'go(9)R2,U5,W14 5.675
S.Duquesne,Pa.(9) U5..5.675
S.SanFran.,Calif.(9)B3 6.425
Sterling,Ill.(1)(9) N15..5.675
Sterling,Ill.(9) N15 ...5.775
Struthers,O.(9) Y1 ....5.675
Tonawanda,N.Y. B12 ..5.675
Torrance,Calif.(9) C11 .6.375
Warren,O. C17 ....6.025
Youngstown(9) R2,U5..5.675

BARS, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.725
Bethlehem,Pa. B2 ....6.725
Bridgeport,Conn. C32 ...6.80
Buffalo R2 ....6.725
Canton,O. R2, T7 ....6.725
Clairton,Pa. U5 ....6.725
Detroit S41 ....6.725
Economy,Pa. B14 ....6.725
Ecorse,Mich. G5 ....6.725
Fairless,Pa. U5 ....6.875
Farrell,Pa. S3 ....6.725
Fontana,Calif. K1 ....7.775
Gary,Ind. U5 ....6.725
Houston S5 ....6.975
Ind.Harbor,Ind. I-2, Y1 6.725
Johnstown,Pa. B2 ....6.725
KansasCity,Mo. S5 ....6.975
Lackawanna,N.Y. B2 ..6.725
LosAngeles B3 ....7.775
Lowellville,O. S3 ....6.725
Massillon,O. R2 ....6.725
Midland,Pa. C18 ....6.725
Owensboro,Ky. G8 ....6.725
Pittsburgh J5 ....6.725
Sharon,Pa. S3 ....6.725
S.Chicago R2, U5, W14..6.725
S.Duquesne,Pa. U5 ....6.725
Struthers,O. Y1 ....6.725
Warren,O. C17 ....6.725
Youngstown U5 ....6.725

BARS & SMALL SHAPES, H.R. High-Strength, Low-Alloy
Aliquippa,Pa. J5 ....8.30
Bessemer,Ala. T2 ....8.30
Bethlehem,Pa. B2 ....8.30
Clairton,Pa. U5 ....8.30
Cleveland R2 ....8.30
Ecorse,Mich. G5 ....8.30
Fairfield,Ala. T2 ....8.30
Fontana,Calif. K1 ....9.00
Gary,Ind. U5 ....8.30
Houston S5 ....8.55
Ind.Harbor,Ind. Y1 ....8.30
Johnstown,Pa. B2 ....8.30
KansasCity,Mo. S5 ....8.55
Lackawanna,N.Y. B2 ..8.30
LosAngeles B3 ....9.00
Pittsburgh J5 ....8.30
Seattle B3 ....9.05
S.Chicago,Ill. R2, W14..8.30
S.Duquesne,Pa. U5 ....8.30
S.SanFrancisco B3 ....9.05
Sterling,Ill. N15 ....7.925
Struthers,O. Y1 ....8.30
Youngstown U5 ....8.30

BAR SIZE ANGLES; H.R. Carbon
Bethlehem,Pa.(9) B2 ..5.825
Houston(9) S5 ....5.925
KansasCity,Mo.(9) S5..5.925
Lackawanna(9) B2 ...5.675
Sterling,Ill. N15 ....5.775
Sterling,Ill.(1) N15 ...5.675
Tonawanda,N.Y. B12 ..5.675

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ....5.675
Atlanta A11 ....5.875
Joliet,Ill. P22 ....5.675
Minnequa,Colo. C10 ...6.125
Niles,Calif. P1 ....6.375
Pittsburgh J5 ....5.675
Portland,Oreg. O4 ....6.425
SanFrancisco S7 ....6.52
Seattle B3 ....6.425

BAR SIZE ANGLES; S. SHAPES
Wrought Iron
Economy,Pa. B14 ....16.45

BAR SHAPES, Hot-Rolled Alloy
Aliquippa,Pa. J5 ....6.80
Clairton,Pa. U5 ....6.80
Gary,Ind. U5 ....6.80
Houston S5 ....7.05
KansasCity,Mo. S5 ....7.05
Pittsburgh J5 ....6.80
Youngstown U5 ....6.80

BARS, C.F. Loaded (Including loaded extra) Carbon
LosAngeles P2, S30 ..11.75*

Alloy
Ambridge,Pa. W18 ...10.175
BeaverFalls,Pa. M12..10.175
Camden,N.J. P13 ....10.35
Chicago W18 ....10.175
Elyria,O. W8 ....10.175
Monaca,Pa. S17 ....10.175
Newark,N.J. W18 ....10.35
SpringCity,Pa. K3 ....10.35

*Grade A; add 0.5c for Grade B.

BARS, Cold-Finished Carbon
Ambridge,Pa. W18 ....7.65
BeaverFalls,Pa. M12,R2..7.65
Birmingham C15 ....8.25
Buffalo B5 ....7.70
Camden,N.J. P13 ....8.10
Carnegie,Pa. C12 ....7.65
Chicago W18 ....7.65
Cleveland A7, C20 ....7.65
Detroit B5, P17 ....7.85
Detroit S41 ....7.65
Donora,Pa. A7 ....7.65
Elyria,O. W8 ....7.65
FranklinPark,Ill. N5 ....7.65
Gary,Ind. R2 ....7.65
GreenBay,Wis. F7 ....7.65
Hammond,Ind. J5, L2 ..7.65
Hartford,Conn. R2 ....8.15
Harvey,Ill. B5 ....7.65
LosAngeles(49) S30 ....9.10
LosAngeles(49) P2, R2..9.10
Mansfield,Mass. B5 ....8.20
Massillon,O. R2, R3 ....7.65
Midland,Pa. C18 ....7.65
Monaca,Pa. S17 ....7.65
Newark,N.J. W18 ....8.10
NewCastle,Pa.(17) B4 ..7.65
Pittsburgh J5 ....7.65
Plymouth,Mich. P5 ....7.90
Putnam,Conn. W18 ....8.20
Readville,Mass. C14 ....8.20
S.Chicago,Ill. W14 ....7.65
SpringCity,Pa. K3 ....8.10
Struthers,O. Y1 ....7.65
Warren,O. C17 ....7.65
Waukegan,Ill. A7 ....7.65
Willimantic,Conn. J5 ..8.15
Youngstown F3, Y1 ....7.65

BARS, Cold-Finished Carbon (Turned and Ground)
Cumberland,Md.(5) C19..6.55

BARS, Cold-Finished Alloy
Ambridge,Pa. W18 ....9.025
BeaverFalls,Pa. M12,R2 9.025
Bethlehem,Pa. B2 ....9.025
Bridgeport,Conn. C32 ..9.175
Buffalo B5 ....9.025
Camden,N.J. P13 ....9.20
Canton,O. T7 ....9.025
Carnegie,Pa. C12 ....9.025
Chicago W18 ....9.025
Cleveland A7, C20 ....9.025
Detroit B5, P17 ....9.225
Detroit S41 ....9.025
Donora,Pa. A7 ....9.025
Elyria,O. W8 ....9.025
FranklinPark,Ill. N5 ..9.025
Gary,Ind. R2 ....9.025
GreenBay,Wis. F7 ....9.025
Hammond,Ind. J5, L2..9.025
Hartford,Conn. R2 ....9.325
Harvey,Ill. R5 ....9.025
Lackawanna,N.Y. B3 ..9.025
LosAngeles P2, S30 ...11.00
Mansfield,Mass. B5 ....9.325
Massillon,O. R2, R8 ....9.025
Midland,Pa. C18 ....9.025
Monaca,Pa. S17 ....9.025
Newark,N.J. W18 ....9.20
Plymouth,Mich. P5 ....9.225
S.Chicago,Ill. W14 ....9.025
SpringCity,Pa. K3 ....9.20
Struthers,O. Y1 ....9.025

Warren,O. C17 .....9.025
Waukegan,Ill A7 .....9.025
Willimantic,Conn. J5 ..9.325
Worcester,Mass. A7 ...9.325
Youngstown F3, Y1 ..9.025

BARS, Reinforcing, Billet (To Fabricators)

AlabamaCity,Ala. R2 ..5.675
Atlanta A11 .....5.25
Birmingham C15 .....5.25
Buffalo R2 .....5.675
Cleveland R2 .....5.675
Ecorse,Mich. G5 .....5.675
Emeryville,Calif. J7 ...6.425
Fairfield,Ala. T2 .....5.675
Fairless,Pa. U5 .....5.825
Fontana,Calif. K1 ....6.375
Ft.Worth,Tex.(26) T4 ..5.25
Gary,Ind. U5 .....5.675
Houston S5 .....5.925
Ind.Harbor,Ind. I-2,Y1.5.675
Johnstown,Pa. B2 .....5.675
Joliet,Ill. P22 .....5.675
KansasCity,Mo. S5 ....5.925
Kokomo,Ind. C16 .....5.775
Lackawanna,N.Y. B2 ..5.675
LosAngeles B3 .....6.375
Madison,Ill. L1 .....5.875
Milton,Pa. M18 .....5.825
Minnequa,Colo. C10 ..6.125
Niles,Calif. P1 .....6.375
Pittsburg,Calif. C11 ..6.375
Pittsburgh J5 .....5.675
Portland,Oreg. O4 .....6.425
SandSprings,Okla. S5 ..5.925
Seattle A24, B3, N14..6.425
S.Chicago,Ill. B2, W14.5.675
S.Duquesne,Pa. U5 ....5.675
S.SanFrancisco B3 ....6.425
SparrowsPoint,Md. B2..5.675
Sterling,Ill.(1) N15 ..5.675
Sterling,Ill. N15 .....5.775
Struthers,O. Y1 .....5.675
Tonawanda,N.Y. B12 ..6.10
Torrance,Calif. C11 ...6.375
Youngstown R2, U5 ..5.675

BARS, Reinforcing, Billet (Fabricated: To Consumers)

Baltimore B2 .....7.42
Boston B2, U8 .....8.15
Chicago U8 .....7.41
Cleveland U8 .....7.39
Houston S5 .....7.60
Johnstown,Pa. B2 .....7.33
KansasCity,Mo. S5 ....7.60
Lackawanna,N.Y. B2 ..7.35
Marion,O. P11 .....6.70
Newark,N.J. U8 .....7.80
Philadelphia U8 .....7.63
Pittsburgh J5, U8 .....7.35
SandSprings,Okla. S5 ..7.60
Seattle A24, B3, N14 ..7.95
SparrowsPt.,Md. B2 ...7.33
St.Paul U8 .....8.17
Williamsport,Pa. S19 ...7.25

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 15.10
Economy,Pa.(D.R.)B14 19.30
Econ.(DirectRolled)B14 13.55
Economy(Staybolt)B14 19.80
McK.Rks.(S.R.) L5 ...14.50
McK.Rks.(D.R.) L5 ...19.80
McK.Rks.(Staybolt)L5. 20.95

BARS, Rail Steel

ChicagoHts.(3) C2, I-2.5.575
ChicagoHts.(4)(44) I-2.5.675
ChicagoHts.(4) C2 ...5.675
Franklin,Pa.(3) F5 ...5.575
Franklin,Pa.(4) F5 ...5.675
JerseyShore,Pa.(3) J8 ..5.55
Marion,O.(3) P11 .....5.575
Tonawanda(3) B12 ....5.575
Tonawanda(4) B12 .....6.10

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

AlabamaCity,Ala. R2 ..5.10
Allenport,Pa. P7 .....5.10
Aliquippa,Pa. J5 .....5.10
Ashland,Ky.(8) A10 ....5.10
Cleveland J5, R2 .....5.10
Conshohocken,Pa. A3 ..5.15
Detroit(8) M1 .....5.10
Ecorse,Mich. G5 .....5.10
Fairfield,Ala. T2 .....5.10
Fairless,Pa. U5 .....5.15
Farrell,Pa. S3 .....5.10
Fontana,Calif. K1 .....5.825
Gary,Ind. U5 .....5.10
Geneva,Utah C11 .....5.20
GraniteCity,Ill.(8) G4 ..5.20
Ind.Harbor,Ind. I-2, Y1.5.10
Irvin,Pa. U5 .....5.10
Lackawanna,N.Y. B2 ...5.10
Mansfield,O. E6 .....5.10
Munhall,Pa. U5 .....5.10
Newport,Ky. A2 .....5.10
Niles,O. M21, S3 .....5.10
Pittsburg,Calif. C11 ....5.80
Pittsburgh J5 .....5.10
Portsmouth,O. P12 ....5.10
Riverdale,Ill. A1 .....5.10
Sharon,Pa. S3 .....5.10
S.Chicago,Ill. U5, W14..5.10
SparrowsPoint,Md. B2 ..5.10
Steubenville,O. W10 ....5.10
Warren,O. R2 .....5.10
Weirton,W.Va. W6 .....5.10
Youngstown U5, Y1 ....5.10

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21, S3 .....6.275

SHEETS, H.R. Alloy

Gary,Ind. U5 .....8.40
Ind.Harbor,Ind. Y1 ....8.40
Irvin,Pa. U5 .....8.40
Munhall,Pa. U5 .....8.40
Newport,Ky. A2 .....8.40
Youngstown U5, Y1 ....8.40

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....7.525
Ashland,Ky. A10 .....7.525
Cleveland J5, R2 .....7.525
Conshohocken,Pa. A3 ..7.575
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.525
Fairless,Pa. U5 .....7.575
Farrell,Pa. S3 .....7.525
Fontana,Calif. K1 .....8.25
Gary,Ind. U5 .....7.525
Ind.Harbor,Ind. I-2, Y1 7.525
Irvin,Pa. U5 .....7.525
Lackawanna(35) B2 ..7.525
Munhall,Pa. U5 .....7.525
Niles,O. S3 .....7.525
Pittsburgh J5 .....7.525
S.Chicago,Ill. U5, W14.7.525
Sharon,Pa. S3 .....7.525
SparrowsPoint(36) B2..7.525
Warren,O. R2 .....7.525
Weirton,W.Va. W6 ....7.525
Youngstown U5, Y1 ...7.525

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ...5.35
Cleveland R2 .....5.875
Warren,O. R2 .....5.875

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....7.05
Middletown,O. A10 ....6.775
Warren,O. R2 .....7.05

SHEETS, Cold-Rolled Steel (Commercial Quality)

AlabamaCity,Ala. R2 ..6.275
Aliquippa,Pa. J5 .....6.275
Allenport,Pa. P7 .....6.275
Cleveland J5, R2 .....6.275
Conshohocken,Pa. A3 ..6.325
Detroit M1 .....6.275
Ecorse,Mich. G5 .....6.275
Fairfield,Ala. T2 .....6.275
Fairless,Pa. U5 .....6.325
Follansbee,W.Va. F4 ..6.275
Fontana,Calif. K1 .....7.40
Gary,Ind. U5 .....6.275
GraniteCity,Ill. G4 ....6.375
Ind.Harbor,Ind. I-2, Y1 6.275
Irvin,Pa. U5 .....6.275
Lackawanna,N.Y. B2 ..6.275
Mansfield,O. E6 .....6.275
Middletown,O. A10 ....6.275
Newport,Ky. A2 .....6.275
Pittsburg,Calif. C11 ....7.225
Pittsburgh J5 .....6.275
Portsmouth,O. P12 ....6.275
SparrowsPoint,Md. B2..6.275
Steubenville,O. W10 ....6.275
Warren,O. R2 .....6.275
Weirton,W.Va. W6 ....6.275
Youngstown Y1 .....6.275

SHEETS, Cold-Rolled, High-Strength, Low-Alloy

Aliquippa,Pa. J5 .....9.275
Cleveland J5, R2 .....9.275
Ecorse,Mich. G5 .....9.275
Fairless,Pa. U5 .....9.325
Fontana,Calif. K1 ....10.40
Gary,Ind. U5 .....9.275
Ind.Harbor,Ind. I-2, Y1 9.275
Lackawanna(38) B2 ..9.275
Pittsburgh J5 .....9.275
SparrowsPoint(33) B2..9.275
Warren,O. R2 .....9.275
Weirton,W.Va. W6 ....9.275
Youngstown Y1 .....9.275

SHEETS, Culvert

	Cu Steel	Cu Fe
Ala.City,Ala. R2	7.225	....
Ashland,Ky. A10	7.225	7.475
Canton,O. R2	7.225	....
Fairfield,Ala. T2	7.225	7.475
Gary,Ind. U5	7.225	7.475
GraniteCity,Ill.G4	7.325	....
Ind.Harbor I-2	7.225	7.475
Irvin,Pa. U5	7.225	7.475
Kokomo,Ind. C16	7.325	....
MartinsFry. W10	7.225	7.475
Pitts.,Calif. C11	7.975	....
Pittsburgh J5	7.225	....
SparrowsPt. B2	7.225	....

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ...7.475

SHEETS, Galvanized Steel Hot-Dipped

AlabamaCity,Ala. R2. .6.875‡
Ashland,Ky. A10 ....6.875‡
Canton,O. R2 .....6.875‡
Dover,O. E6 .....6.875†
Fairfield,Ala. T2 ....6.875†
Gary,Ind. U5 .....6.875†
GraniteCity,Ill. G4 ...6.975*
Ind.Harbor,Ind. I-2 ..6.875†
Irvin,Pa. U5 .....6.875†
Kokomo,Ind. C16 ....6.975‡
MartinsFerry,O. W10..6.875*
Middletown,O. A10 ..6.875†
Pittsburg,Calif. C11 ...7.625*
Pittsburgh J5 .....6.875†
SparrowsPt.,Md. B2 ..6.875†
Warren,O. R2 .....6.875†
Weirton,W.Va. W6 ..6.875*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....10.125
Pittsburgh J5 .....10.125
SparrowsPt.(39) B2 ..10.025

SHEETS, Galvanized Steel

Canton,O. R2 .....7.275
Irvin,Pa. U5 .....7.275

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....7.125
Middletown,O. A10 ....7.125

SHEETS, Electrogalvanized

Cleveland(28) R2 .....7.65
Niles,O.(28) R2 .....7.65
Weirton,W.Va. W6 ....7.50
Youngstown J5 .....7.50

SHEETS, Well Casing

Fontana,Calif. K1 ....7.325

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 9.525
Butler,Pa. A10 (type 2) 9.625
Irvin,Pa. U5 (type 1)..9.525

SHEETS, Enameling

Ashland,Ky. A10 .....6.775
Cleveland R2 .....6.775
Fairfield,Ala. T2 .....6.775
Gary,Ind. U5 .....6.775
Ind.Harbor,Ind. I-2, Y1 6.775
Irvin,Pa. U5 .....6.775
Middletown,O. A10 ....6.775
Niles,O. M21, S3 .....6.775
SparrowsPoint,Md. B2..6.775
Youngstown Y1 .....6.775

BLUED STOCK, 29 Gage

Dover,O. E6 .....8.70
Ind.Harbor,Ind. I-2 ....8.70
Mansfield,O. E6 .....8.70
Warren,O. R2 .....8.70
Yorkville,O. W10 .....8.70

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va.W10 7.225
Gary,Ind. U5 .....7.225
Mansfield,O. E6 .....7.225
Middletown,O. A10 ....7.225
Niles,O. M21, S3.....7.225
Warren,O. R2 .....7.225
Weirton,W.Va. W6 ....7.225

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.625

Key to Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U. S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A24 Alaska Steel Mills Inc.

B1 Babcock & Wilcox
B2 Bethlehem Steel Co.
B3 Bethlehem Steel Co., Pacific Coast Div.
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co., Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Plant, Wickwire Spencer Steel Div., Colo. Fuel & Iron
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.
C32 Carpenter Steel of N.Eng.

D2 Detroit Steel Corp.
D4 Disston Div., H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 Eastern Gas&Fuel Assoc.
E2 Eastern Stainless Steel
E6 Empire-Reeves Steel
E10 Enamel Prod. & Plating

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
G8 Green River Steel Corp.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins Steel Tube Works
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L6 Lone Star Steel Co.
L7 Lukens Steel Co.
L8 Leschen Wire Rope Div., H. K. Porter Co. Inc.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M14 McInnes Steel Co.
M16 Md. Fine & Specialty Wire Co. Inc.
M17 Metal Forming Corp.
M18 Milton Steel Div. Merritt-Chapman&Scott
M21 Mallory-Sharon Metals Corp.
M22 Mill Strip Products Co.
M23 Mill Strip Products Co. of Pennsylvania

N1 National-Standard Co.
N2 National Supply Co.
N3 National Tube Div., U. S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N14 Northwest. Steel Rolling Mills Inc.
N15 Northwestern S.&W. Co.
N20 Neville Ferro Alloy Co.

O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Div., Detroit Steel Corp.
P13 Precision Drawn Steel
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., American Chain & Cable
P17 Plymouth Steel Corp.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.
P24 Phil. Steel & Wire Corp.

R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forging Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Div., Copperweld Steel Co.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Div., Bliss & Laughlin Inc.
S40 Seneca Steel Service
S41 Stainless & Strip Div., J & L Steel Corp.
S42 Southern Elec. Steel Co.
S43 Seymour Mfg. Co.
S44 Screw & Bolt Corp. of America

T2 Tenn. Coal & Iron Div., U. S. Steel Corp.
T3 Tenn. Products & Chemical Corp.
T4 Texas Steel Co.
T5 Thomas Strip Div., Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U3 Union Wire Rope Corp.
U4 Universal-Cyclops Steel
U5 U. S. Steel Corp.
U6 U. S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U. S. Steel Supply Div., U. S. Steel Corp.
U11 Union Carbide Metals Co.
U13 Union Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan-Kidd Steel Div., H. K. Porter Co.

W1 Wallace Barnes Steel Div., Associated Spring
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet & Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	5.10
Allenport,Pa. P7	5.10
Alton,Ill. L1	5.30
Ashland,Ky.(8) A10	5.10
Atlanta A11	5.10
Bessemer,Ala. T2	5.10
Birmingham C15	5.10
Conshohocken,Pa. A3	5.15
Detroit M1	5.10
Ecorse,Mich. G5	5.10
Fairfield,Ala. T2	5.10
Farrell,Pa. S3	5.10
Fontana,Calif. K1	5.825
Gary,Ind. U5	5.10
Ind.Harbor,Ind. I-2, Y1	5.10
Johnstown,Pa.(25) B2	5.10
Lackaw'na,N.Y.(25) B2	5.10
LosAngeles(25) B3	5.85
LosAngeles C1	8.60
Minnequa,Colo. C10	6.20
Riverdale,Ill. A1	5.10
SanFrancisco S7	6.60
Seattle(25) B3	6.10
Seattle N14	6.60
Sharon,Pa. S3	5.10
S.Chicago,Ill. W14	5.10
S.SanFrancisco(25) B3	5.85
SparrowsPoint,Md. B2	5.10
Torrance,Calif. C11	5.85
Warren,O. R2	5.10
Weirton,W.Va. W6	5.10
Youngstown U5	5.10

STRIP, Hot-Rolled Alloy

Carnegie,Pa. S18	8.40
Farrell,Pa. S3	8.40
Gary,Ind. U5	8.40
Houston S5	8.65
Ind.Harbor,Ind. Y1	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.60
Lowellville,O. S3	8.40
Newport,Ky. A2	8.40
Sharon,Pa. A2, S3	8.40
S.Chicago,Ill. W14	8.40
Youngstown U5, Y1	8.40

STRIP, Hot-Rolled High-Strength, Low-Alloy

Ashland,Ky. A10	7.575
Bessemer,Ala. T2	7.575
Conshohocken,Pa. A3	7.575
Ecorse,Mich. G5	7.575
Fairfield,Ala. T2	7.575
Farrell,Pa. S3	7.575
Gary,Ind. U5	7.575
Ind.Harbor,Ind. I-2, Y1	7.575
Lackawanna,N.Y. B2	7.575
LosAngeles(25) B3	8.325
Seattle(25) B3	8.575
Sharon,Pa. S3	7.575
S.Chicago,Ill. W14	7.575
S.SanFrancisco(25) B3	8.325
SparrowsPoint,Md. B2	7.575
Warren,O. R2	7.575
Weirton,W.Va. W6	7.575
Youngstown U5, Y1	7.575

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	5.35
Warren,O. R2	5.875

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	7.425
Baltimore T6	7.425
Boston T6	7.975
Buffalo S40	7.425
Cleveland A7, J5	7.425
Dearborn,Mich. S3	7.425
Detroit D2, M1, P20	7.425
Dover,O. G6	7.425
Evanston,Ill. M22	7.525
Farrell,Pa. S3	7.425
Follansbee,W.Va. W10	7.425
Fontana,Calif. K1	9.20
FranklinPark,Ill. T6	7.525
Ind.Harbor,Ind. Y1	7.425
Indianapolis S41	7.575
LosAngeles C1, S41	9.30
McKeesport,Pa. E10	7.525
NewBedford,Mass. R10	7.875
NewBritain,Conn. S15	7.875
NewCastle,Pa. B4, M22	7.425
NewHaven,Conn. D2	7.875
NewKensington,Pa. A6	7.425
Pawtucket,R.I. R3, N8	7.975
Philadelphia P24	7.875
Pittsburgh J5	7.425
Riverdale,Ill. A1	7.525
Rome,N.Y.(32) R6	7.425
Sharon,Pa. S3	7.425
Trenton,N.J.(31) R5	8.875
Warren,O. R2, T5	7.425
Worcester,Mass. A7	7.975

STRIP, Cold-Rolled Alloy

Boston T6	15.90
Cleveland A7	15.55
Carnegie,Pa. S18	15.55
Dover,O. G6	15.55
Farrell,Pa. S3	15.55
FranklinPark,Ill. T6	15.55
Harrison,N.J. S18	15.55
Indianapolis S41	15.70
LosAngeles S41	17.75
Lowellville,O. S3	15.55
Pawtucket,R.I. N8	15.90
Riverdale,Ill. A1	15.55
Sharon,Pa. S3	15.55
Worcester,Mass. A7	15.85
Youngstown S41	15.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.80
Dearborn,Mich. S3	10.80
Dover,O. G6	10.80
Farrell,Pa. S3	10.80
Ind.Harbor,Ind. Y1	10.80
Sharon,Pa. S3	10.80
Warren,O. R2	10.80
Weirton,W.Va. W6	10.80
Youngstown Y1	10.80

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	8.175

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Anderson,Ind. G6	9.10	....	....	....	....
Baltimore T6	9.50	10.70	12.90	15.90	18.85
Boston T6	9.50	10.70	12.90	15.90	18.85
Bristol,Conn. W1	....	10.70	12.90	16.10	19.30
Carnegie,Pa. S18	8.95	10.40	12.60	15.60	....
Cleveland A7	8.95	10.40	12.60	15.60	18.55
Dearborn,Mich. S3	9.05	10.50	12.70	....	....
Detroit D2	9.05	10.50	12.70	15.70	....
Dover,O. G6	8.95	10.40	12.60	15.60	18.55
Evanston,Ill. M22	9.05	10.10	12.60	15.60	....
Farrell,Pa. S3	8.95	10.40	12.60	15.60	18.55
Fostoria,O. S1	10.05	10.40	12.60	15.60	....
FranklinPark,Ill. T6	9.05	10.40	12.60	15.60	18.55
Harrison,N.J. C18	....	....	12.90	16.10	19.30
Indianapolis S41	9.10	10.55	12.60	15.60	18.55
LosAngeles C1	11.15	12.60	14.80	17.80	....
LosAngeles S41	11.15	12.60	14.80	....	....
NewBritain,Conn. S15	9.40	10.70	12.90	15.90	18.85
NewCastle,Pa. B4, M23	8.95	10.10	12.60	15.60	....
NewHaven,Conn. D2	9.40	10.70	12.90	15.90	....
NewKensington,Pa. A6	8.95	10.40	12.60	15.60	....
NewYork W3	....	10.70	12.90	16.10	19.30
Pawtucket,R.I. N8	9.50	10.70	12.90	15.90	18.85
Riverdale,Ill. A1	9.05	10.40	12.60	15.60	18.55
Rome,N.Y. R6	8.95	10.40	12.60	15.60	18.55
Sharon,Pa. S3	8.95	10.40	12.60	15.60	18.55
Trenton,N.J. R5	....	10.70	12.90	15.90	18.85
Warren,O. T5	8.95	10.40	12.60	15.60	18.55
Worcester,Mass. A7, T6	9.50	10.70	12.90	15.90	18.85
Youngstown S41	8.95	10.40	12.60	15.60	18.55

Spring Steel (Tempered)	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	....	18.85	22.95	27.80
Buffalo W12	....	18.85	....	....
Fostoria,O. S1	....	19.05	22.15	....
FranklinPark,Ill. T6	....	19.20	23.30	28.15
Harrison,N.J. C18	....	18.85	22.95	27.80
NewYork W3	....	18.85	22.95	27.80
Palmer,Mass. W12	....	18.85	....	....
Trenton,N.J. R5	....	18.85	22.95	27.80
Worcester,Mass. A7, T6	....	18.85	22.95	27.80
Youngstown S41	....	19.20	23.30	28.15

STRIP, C.R., Electrogalvanized

Cleveland A7	7.425*
Dover,O. G6	7.425*
Evanston,Ill. M22	7.525*
McKeesport,Pa. E10	7.50*
NewCastle,Pa. M22	7.425*
Riverdale,Ill. A1	7.525*
Warren,O. B9, S3, T5	7.425*
Worcester,Mass. A7	7.975
Youngstown S41, Y1	7.425*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Farrell,Pa. S3	7.50
Sharon,Pa. S3	7.50

TIGHT COOPERAGE HOOP

Atlanta A11	5.825
Farrell,Pa. S3	5.525
Riverdale,Ill. A1	5.675
Sharon,Pa. S3	5.525
Youngstown U5	5.525

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$9.10	$9.35	$9.75
Fairfield,Ala. T2	9.20	9.45	9.85
Fairless,Pa. U5	9.20	9.45	9.85
Fontana,Calif. K1	9.75	10.00	10.40
Gary,Ind. U5	9.10	9.35	9.75
GraniteCity,Ill. G4	9.20	9.45	9.85
IndianaHarbor,Ind. I-2, Y1	9.10	9.35	9.75
Irvin,Pa. U5	9.10	9.35	9.75
Niles,O. R2	9.10	9.35	9.75
Pittsburg,Calif. C11	9.75	10.00	10.40
SparrowsPoint,Md. B2	9.10	9.35	9.75
Weirton,W.Va. W6	9.10	9.35	9.75
Yorkville,O. W10	9.10	9.35	9.75

ELECTROLYTIC TIN-COATED SHEET (Dollars per 100 lb)			
Aliquippa,Pa. J5 (21-27 Ga.)	7.90	8.10	....
IndianaHarbor,Ind. Y1 (20-27 Ga.)	7.90	....	....
Niles,O. R2 (20-27 Ga.)	7.90	8.10	8.30

TIN PLATE, Hot Dipped Common Coke	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$10.40	$10.65
Fairfield,Ala. T2	10.50	10.75
Fontana,Calif. K1	11.05	11.30
Gary,Ind. U5	10.40	10.65
Ind.Harbor Y1	10.40	10.65
Irvin,Pa. U5	10.40	10.65
Pitts.,Calif. C11	11.05	11.30
Sp.Pt.,Md. B2	10.40	10.65
Weirton,W.Va. W6	10.40	10.65
Yorkville,O. W10	10.40	10.65

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$8.20
Fairfield,Ala. T2	8.30
Fairless,Pa. U5	8.30
Fontana,Calif. K1	8.85
Gary,Ind. U5	8.20
GraniteCity,Ill. G4	8.30
Ind.Harbor,Ind. I-2, Y1	8.20
Irvin,Pa. U5	8.20
Niles,O. R2	8.20
Pittsburg,Calif. C11	8.85
SparrowsPoint,Md. B2	8.20
Weirton,W.Va. W6	8.20
Yorkville,O. W10	8.20

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	7.85
Gary,Ind. U5	7.85
GraniteCity,Ill. G4	7.95
Ind.Harbor,Ind. Y1	7.85
Irvin,Pa. U5	7.85
Yorkville,O. W10	7.85

MANUFACTURING TERNES (Special Coated, Base Box)

Gary,Ind. U5	$10.05
Irvin,Pa. U5	10.05

SILICON STEEL

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	....	11.70	12.40	13.35	14.65
Brackenridge,Pa. A4	....	....	12.40	13.55	14.65
GraniteCity,Ill. G4	9.975*	11.30*	12.00*	13.15*	....
IndianaHarbor,Ind. I-2	9.875*	11.20*	11.90*	13.05*	....
Mansfield,O. E6	9.875*	11.70	12.40	13.55	14.65
Newport,Ky. A2	9.875	11.70*	12.40*	13.55*	14.65*
Niles,O. M21	9.875*	11.70	12.40	13.55	....
Vandergrift,Pa. U5	9.875*	11.70	12.40	13.55	14.65
Warren,O. R2	9.875*	11.70	12.40	13.55	14.65
Zanesville,O. A10	....	11.70†	12.40	13.55	14.65

	Stator
Vandergrift,Pa. U5	8.10
Mansfield,O. E6	8.10
Warren,O. R2 (Silicon Lowcore)	8.10

SHEETS (22 Ga., coils & cut lengths)

Fully Processed (Semiprocessed ½c lower)	T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	15.70	16.30	16.80	17.85
Vandergrift,Pa. U5	15.70	16.30	16.80	17.85
Zanesville,O. A10	15.70	16.30	16.80	17.85

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	18.10	19.70	20.20	20.70	15.70††
Butler,Pa. A10	....	....	....	19.70	20.20	20.70
Vandergrift,Pa. U5	17.10	18.10	19.70	20.20	20.70	15.70
Warren,O. R2	....	....	....	....	....	15.70‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed; semiprocessed ½c lower. ††Coils only.

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	8.00
Aliquippa,Pa. J5	8.00
Alton,Ill. L1	8.20
Atlanta A1	8.00
Bartonville,Ill. K4	8.10
Buffalo W12	8.00
Chicago W13	8.00
Cleveland A7, C20	8.00
Crawfordsville,Ind. M8	8.10
Donora,Pa. A7	8.00
Duluth A7	8.00
Fairfield,Ala. T2	8.00
Fostoria,O.(24) S1	8.10
Houston S5	8.25
Jacksonville,Fla. M8	8.35
Johnstown,Pa. B2	8.00
Joliet,Ill. A7	8.00
KansasCity,Mo. S5	8.25
Kokomo,Ind. C16	8.10
LosAngeles B3	8.95
Minnequa,Colo. C10	8.25
Monessen,Pa. P7, P16	8.00
Palmer,Mass. W12	8.30
Pittsburg,Calif. C11	8.95
Portsmouth,O. P12	8.00
Rankin,Pa. A7	8.00
S.Chicago,Ill. R2	8.00
S.SanFancisco C10	8.95
SparrowsPoint,Md. B2	8.10
Sterling,Ill.(1) N15	8.00
Sterling,Ill. N15	8.10
Struthers,O. Y1	8.00
Waukegan,Ill. A7	8.00
Worcester,Mass. A7	8.30

WIRE, Cold Heading Carbon

Elyria,O. W8	8.00

WIRE, Gal'd., for ACSR

Bartonville,Ill. K4	12.65
Buffalo W12	13.40
Cleveland A7	12.65
Donora,Pa. A7	12.65
Duluth A7	12.65
Johnstown,Pa. B2	13.40
KansasCity,Mo. U3	12.90
Minnequa,Colo. C10	12.775
Monessen,Pa. P7, P16	12.65
Munice,Ind. I-7	13.60
NewHaven,Conn. A7	12.95
Palmer,Mass. W12	13.70
Pittsburg,Calif. C11	13.45
Portsmouth,O. P12	12.65
Roebling, N. J. R5	12.95
SparrowsPt. Md. B2	13.50
Struthers,O. Y1	13.40
Trenton,N.J. A7	12.95
Waukegan,Ill. A7	12.65
Worcester,Mass. A7	12.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
Kokomo,Ind. C16	9.85
LosAngeles B3	10.70
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
NewHaven,Conn. A7	10.05
Palmer,Mass. W12	10.05
Pittsburg,Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Worcester,Mass. A7, J4, T6	10.05

WIRE, MB Spring, High-Carbon

Aliquippa,Pa. J5	9.75
Alton,Ill. L1	9.95
Bartonville,Ill. K4	9.85
Buffalo W12	9.75
Cleveland A7	9.75
Donora,Pa. A7	9.75
Duluth A7	9.75
Fostoria,O. S1	9.80
Johnstown,Pa. B2	9.75
KansasCity,Mo. S5, U3	10.00
LosAngeles B3	10.70
Millbury,Mass.(12) N6	10.05
Minnequa,Colo. C10	9.95
Monessen,Pa. P7, P16	9.75
Munice,Ind. I-7	9.95
Palmer,Mass. W12	10.05
Pittsburg Calif. C11	10.70
Portsmouth,O. P12	9.75
Roebling,N.J. R5	10.05
S.Chicago,Ill. R2	9.75
S.SanFrancisco C10	10.70
SparrowsPt.,Md. B2	9.85
Struthers,O. Y1	9.75
Trenton,N.J. A7	10.05
Waukegan,Ill. A7	9.75
Wor'ster,Mass.A7,J4,T6	10.05

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	16.50
Bartonville,Ill. K4	16.40
Chicago W13	16.30
Cleveland A7	16.30
Crawfordsville,Ind. M8	16.40
Fostoria,O. S1	16.30
Houston S5	16.55
Jacksonville,Fla. M8	16.65
Johnstown,Pa. B2	16.30
KansasCity,Mo. S5	16.55
Kokomo,Ind. C16	16.30
Minnequa,Colo. C16	16.55
Monessen,Pa. P16	16.30
Muncie,Ind. I-7	16.50
Palmer,Mass. W12	16.60
S.SanFrancisco C10	17.15
Waukegan,Ill. A7	16.30
Worcester,Mass. A7, J6	16.60

ROPE WIRE (A)

Bartonville,Ill. K4	13.45
Buffalo W12	13.45
Fostoria,O. S1	13.45
Johnstown,Pa. B2	13.45
KansasCity,Mo. U3	13.70
Monessen,Pa. P7	13.45
Muncie,Ind. I-7	13.65
Palmer,Mass. W12	13.75
Portsmouth,O. P12	13.45
Roebling,N.J. R5	13.75
St.Louis L8	13.45
SparrowsPt.,Md. B2	13.55
Struthers,O. Y1	13.45
Worcester,Mass. J4	13.75

(A) Plow and Mild Plow; add 0.25c for Improved Plow.

WIRE, Tire Bead

Bartonville,Ill. K4	17.15
Monessen,Pa. P16	17.15
Roebling,N.J. R5	17.65

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	12.35
Baltimore T6	12.65
Boston T6	12.65
Buffalo W12	12.35
Chicago W13	12.45
Cleveland A7	12.35
Crawfordsville,Ind. M8	12.35
Dover,O. G6	12.35
Farrell,Pa. S3	12.35
Fostoria,O. S1	12.35
FranklinPark,Ill. T6	12.45
Kokomo,Ind. C16	12.35
Massillon,O. R8	12.35
Milwaukee C23	12.55
Monessen,Pa. P7, P16	12.35
Palmer,Mass. W12	12.65
Pawtucket,R.I. N8	12.65
Philadelphia P24	12.65
Riverdale,Ill. A1	12.45
Rome,N.Y. R6	12.35
Sharon,Pa. S3	12.35
Trenton,N.J. R5	12.65
Warren,O. B9	12.35
Worcester,Mass. A7,T6	12.65

NAILS, Stock Sizes

	Col.
AlabamaCity,Ala. R2	173
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Chicago W13	173
Cleveland A9	173
Crawfordsville,Ind. M8	175
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	178
Jacksonville,Fla. M8	175
Johnstown,Pa. B2	173
Joliet,Ill. A7	173
KansasCity,Mo. S5	178
Kokomo,Ind. C16	175
Minnequa,Colo. C10	178
Monessen,Pa. P7	173
Pittsburg,Calif. C11	192
Rankin,Pa. A7	173
S.Chicago,Ill. R2	173
SparrowsPt.,Md. B2	175
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

(To Wholesalers: per cwt)

Galveston,Tex. D7	$10.30

NAILS, Cut (100 lb kegs)

Wheeling,W.Va. W10	$10.10

POLISHED STAPLES

	Col.
AlabamaCity,Ala. R2	175
Aliquippa,Pa. J5	173
Atlanta A11	173
Bartonville,Ill. K4	175
Crawfordsville,Ind. M8	177
Donora,Pa. A7	173
Duluth A7	173
Fairfield,Ala. T2	173
Houston S5	180
Jacksonville,Fla. M8	177
Johnstown,Pa. B2	175
Joliet,Ill. A7	173
KansasCity,Mo. S5	180
Kokomo,Ind. C16	177
Minnequa,Colo. C10	178
Pittsburg,Calif. C11	194
Rankin,Pa. A7	173
S.Chicago,Ill. R2	175
SparrowsPt.,Md. B2	177
Sterling,Ill.(7) N15	175
Worcester,Mass. A7	179

TIE WIRE, Automatic Baler (14½ Ga.)(per 97 lb Net Box) Coil No. 3150

AlabamaCity,Ala. R2	$8.78
Atlanta A11	10.36
Bartonville,Ill. K4	8.88
Buffalo W12	10.26
Chicago W13	9.24
Crawfordsville,Ind. M8	8.88
Donora,Pa. A7	8.78
Duluth A7	8.78
Fairfield,Ala. T2	8.78
Houston S5	10.51
Jacksonville,Fla. M8	8.88
Johnstown,Pa. B2	8.78
Joliet,Ill. A7	8.78
KansasCity,Mo. S5	10.51
Kokomo,Ind. C16	8.88
LosAngeles B3	9.44
Minnequa,Colo. C10	9.02
Pittsburg,Calif. C11	9.44
S.Chicago,Ill. R2	8.78
S.SanFrancisco C10	9.94
SparrowsPt.,Md. B2	8.88
Sterling,Ill.(37) N15	8.88

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.06
Atlanta A11	10.70
Bartonville,Ill. K4	9.16
Buffalo W12	10.60
Chicago W13	9.54
Crawfordsville,Ind. M8	9.16
Donora,Pa. A7	9.06
Duluth A7	9.06
Fairfield,Ala. T2	9.06
Houston S5	10.85
Jacksonville,Fla. M8	9.16
Johnstown,Pa. B2	9.06
Joliet,Ill. A7	9.06
KansasCity,Mo. S5	10.85
Kokomo,Ind. C16	9.16
LosAngeles B3	9.75
Minnequa,Colo. C10	9.30
Pittsburg,Calif. C11	9.75
S.Chicago,Ill. R2	9.06
S.SanFrancisco C10	10.28
SparrowsPt.,Md. B2	9.16
Sterling,Ill.(37) N15	9.16

Coil No. 6500 Interim

AlabamaCity,Ala. R2	$9.11
Atlanta A11	10.75
Bartonville,Ill. K4	9.21
Buffalo W12	10.65
Chicago W13	9.59
Crawfordsville,Ind. M8	9.21
Donora,Pa. A7	9.11
Duluth A7	9.11
Fairfield,Ala. T2	9.11
Houston S5	10.90
Jacksonville,Fla. M8	9.21
Johnstown,Pa. B2	9.11
Joliet,Ill. A7	9.11
KansasCity,Mo. S5	10.96
Kokomo,Ind. C16	9.21
LosAngeles B3	9.80
Minnequa,Colo. C10	9.35
Pittsburg,Calif. C11	9.80
S.Chicago,Ill. R2	9.11
S.SanFrancisco C10	10.31
SparrowsPt.,Md. B2	9.21
Sterling,Ill.(37) N15	9.21

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	212
Atlanta A11	212
Bartonville,Ill. K4	214
Crawfordsville,Ind. M8	214
Donora,Pa. A7	212
Duluth A7	212
Fairfield,Ala. T2	212
Houston S5	217
Jacksonville,Fla. M8	214
Joliet,Ill. A7	212
KansasCity,Mo. S5	217
Kokomo,Ind. C16	214
Minnequa,Colo. C10	217
Pittsburg,Calif. C11	236
S.SanFrancisco C10	236
SparrowsPt.,Md. B2	214
Sterling,Ill.(7) N15	214

FENCE POSTS

	Col.
Birmingham C15	177
ChicagoHts.,Ill. C2, I-2	177
Duluth A7	177
Franklin,Pa. F5	177
Johnstown,Pa. B2	177
Marion,O. P11	177
Minnequa,Colo. C10	182
Tonawanda,N.Y. B12	177

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	193**
Aliquippa,Pa. J5	190‡
Atlanta A11	197*
Bartonville,Ill. K4	199
Crawfordsville,Ind. M8	198
Donora,Pa. A7	193†
Duluth A7	193†
Fairfield,Ala. T2	193†
Houston S5	198**
Jacksonville,Fla. M8	198
Johnstown,Pa. B2	196‡
Joliet,Ill. A7	193†
KansasCity,Mo. S5	198**
Kokomo,Ind. C16	195†
Minnequa,Colo. C10	198**
Monessen,Pa. P7	196‡
Pittsburg,Calif. C11	213†
Rankin,Pa. A7	193†
S.Chicago,Ill. R2	193**
S.SanFrancisco C10	213*
SparrowsPoint,Md. B2	198‡
Sterling,Ill.(7) N15	198

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	187**
Aliq'ppa,Pa. 9-11½ga. J5	190‡
Atlanta A11	191*
Bartonville,Ill. K4	193
Crawfordsville,Ind. M8	192
Donora,Pa. A7	187†
Duluth A7	187†
Fairfield,Ala. T2	187†
Houston S5	192**
Jacksonville,Fla. M8	192
Johnstown,Pa.(43) B2	190‡
Joliet,Ill. A7	187†
KansasCity,Mo. S5	192**
Kokomo,Ind. C16	189†
Minnequa,Colo. C10	192**
Pittsburg,Calif. C11	210†
Rankin,Pa. A7	187†
S.Chicago,Ill. R2	187**
Sterling,Ill.(7) N15	192

WIRE (16 gage) Stone

	An'ld Galv. Stone
Ala.City,Ala. R2	17.85 19.40**
Aliq'ppa,Pa. J5	17.85 19.65
P'rtonville K4	17.95 19.80
Cleveland A7	17.85
Craw'dville M8	17.95 19.80‡‡
Fostoria,O. S1	18.35 19.90†
Houston S5	18.10 19.65**
Jacksonville M8	18.95 19.80‡‡
Johnstown B2	17.85 19.65‡
Kan.City,Mo. S5	18.10
Kokomo C16	17.95 19.50†
Minnequa C10	18.10 19.65**
P'lm'r,Mass. W12	18.15 19.70†
Pitts.,Calif. C11	18.20 19.75†
S.SanFran. C10	18.20 19.75**
St'ling(37) N15	17.95 19.80
SparrowsPt. B2	17.95 19.75‡
Waukegan A7	17.85 19.40†
Worcester A7	18.15

WIRE, Merchant Quality (6 to 8 gage)

	An'ld Galv.
Ala.City,Ala. R2	9.00 9.55**
Aliquippa J5	8.65 9.325‡
Atlanta(48) A11	9.00 9.75*
Bartonville(48) K4	9.85 19.90
Buffalo W12	9.00 9.55†
Cleveland A7	9.00
Crawfordsville M8	9.10 9.80††
Donora,Pa. A7	9.00 9.55†
Duluth A7	9.00 9.55†
Fairfield 72	9.00 9.55†
Houston(48) S5	9.25 9.80**
Jack'ville,Fla. M8	9.10 9.80‡‡
Johnstown(48) B2	9.00 9.675‡
Joliet,Ill. A7	9.00 9.55†
KansasCity(48) S5	9.25 9.80**
Kokomo(48) S16	9.10 9.65†
LosAngeles B3	9.95 10.625‡
Minnequa C10	9.25 9.80**
Monessen(48) P7	8.65 9.35‡
Palmer,Mass. W12	9.30 9.85†
Pitts.,Calif. C11	9.95 10.50†
Rankin,Pa. A7	9.00 9.55†
S.Chicago R2	9.00 9.55**
S.SanFran. C10	9.95 10.50**
Spar'wsPt.(48) B2	9.10 9.775‡
St'ling(37)(48) N15	9.10 9.80
Struthers,O. Y1	9.00 9.65‡
Worcester,Mass. A7	9.30 9.85†

Based on zinc prices of: *13.50c. †5c. ‡10c. ‡‡Less than 10c. †††0.50c. ‡‡‡11.00c. **Subject to zinc equalization extras.

FASTENERS

(Consumer discounts per cent off list prices, orders for 1 container for assorted sizes; for less than container quantities, add 25 per cent; attaching nuts to bolts, package sizes, add 7.5 per cent; heavy hex nut 1⅛ in. through 1½ in. tapped 8 threads, add 10 per cent)

HEX HEAD CAP SCREWS, coarse, or fine thread, packaged or bulk, with or without hex nuts, 1020 steel bright and high carbon heat treated, ¼ in. thru 1 in. diam., listed lengths:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
Bulk	50

BOLTS, Standard stock sizes:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packaged	43.75
*Bulk	50

*Hot galvanized or zinc plated lag bolts only — for package or bulk quantities use applicable list less bulk discounts.

HEXAGON NUTS, American Standard: Finished hex, hex jam, and hex slotted coarse or fine thread, ¼ in. through 3 in., finished hex thick, thick and slotted, castle, fine thread, ¼ in. through 1½ in., semifinished hex heavy, heavy and jam, heavy and slotted, coarse thread, ¼ in. through 4 in., and

SQUARE NUTS, American Standard: Regular square and heavy square, coarse thread, ¼ in. through 2 in.:

Plain Finish	50
Hot Galvanized and Zinc Plated:	
Packages	43.75
Bulk	50

CAP AND SETSCREWS,

Fillister Head, Cap Screws, Coarse Thread:

Packages	+55
Bulk	+16

Flat Head Cap Screws:

¾ in. and smaller, 6 in. and shorter:

Packages	+85
Bulk	+38

Setscrews, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam., 6 in. and shorter:	
Packages	+5
Bulk	19
Through 1 in. diam., longer than 6 in.:	
Packages	+29

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½ in., larger 12.85

⅞ in. and smaller by 6 in. and shorter: 15% off list.

PRESTRESSED STRAND

(High strength, stress relieved; 7 wire uncoated. Net prices per 1000 ft, 40,000 lb and over)

	Standard Diameter, Inches 1/4	5/16	3/8	7/16	1/2
Buffalo W12	$26.20	$38.80	$47.90	$61.30	$80.30
KansasCity,Mo. U3	26.20	38.50	47.90	61.30	80.30
Minnequa,Colo. C10	26.20	38.50	47.90	61.30	80.30
Pittsburg,Calif. C11	26.20	38.50	47.90	61.30	80.30
Roebling,N.J. R5	26.20	38.50	47.90	61.30	80.30
SparrowsPoint,Md. B2	26.20	38.50	47.90	61.30	80.30
St.Louis L8	26.20	38.50	47.90	61.30	80.30
Waukegan,Ill. A7	26.20	38.50	47.90	61.30	80.30

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut length 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	27.24	23.13
1¼	13	....	32.25	24.41
1½	13	30.42	35.65	26.98
1¾	13	35.94	42.12	31.89
2	13	40.28	47.21	35.74
2¼	13	45.36	53.17	40.26
2¼	12	49.24	57.72	43.70
2½	12	54.23	63.57	48.13
2¾	12	58.73	68.83	52.13
3	12	62.62	73.40	55.59

RAILWAY MATERIALS

Rails	Standard No. 1	Standard No. 2	All No. 2	Tee Rails 60 lb Under
Bessemer,Pa. U5	5.75	5.65	....	6.725
Ensley,Ala. T2	5.75	5.65	....	6.725
Fairfield,Ala. T2	....	....	....	6.725
Gary,Ind. U5	5.75	5.65	....	....
Huntington,W.Va. C15	....	....	....	6.725
Johnstown,Pa. B2	....	....	....(16)	6.725
Lackawanna,N.Y. B2	5.75	5.65	....	6.725
Minnequa,Colo. C10	5.75	5.65	....	7.225
Steelton,Pa. B2	5.75	5.65	....	....
Williamsport,Pa. S19	....	....	....	6.725

TIE PLATES

Fairfield,Ala. T2	6.875
Gary,Ind. U5	6.875
Lackawanna,N.Y. B2	6.875
Minnequa,Colo. C10	6.875
Seattle B3	7.025
Steelton,Pa. B2	6.875
Torrance,Calif. C11	7.025

JOINT BARS

Bessemer,Pa. U5	7.25
Fairfield,Ala. T2	7.25
Joliet,Ill. U5	7.25
Lackawanna,N.Y. B2	7.25
Minequa,Colo. C10	7.25
Steelton,Pa. B2	7.25

AXLES

Ind.Harbor,Ind. S13	9.125
Johnstown,Pa. B2	9.125

SCREW SPIKES

Lebanon,Pa. B2	15.10

TRACK BOLTS, Untreated

Cleveland R2	15.35
KansasCity,Mo. S5	15.35
Lebanon,Pa. B2	15.35
Minnequa,Colo. C10	15.35
Pittsburgh S44	15.35
Seattle B3	15.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	10.10
Ind.Harbor,Ind. I-2, Y1	10.10
KansasCity,Mo. S5	10.10
Lebanon,Pa. B2	10.10
Minnequa,Colo. C10	10.10
Pittsburgh J5	10.10
Seattle B3	10.60
S.Chicago,Ill. R2	10.10
Struthers,O. Y1	10.10
Youngstown R2	10.10

Footnotes

(1) Chicago base.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 15/16 in.; 6.70c; 1 15/16 to 8 in., inclusive, 7.05c.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(12) Worcester, Mass., base.
(15) ⅝" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Deld. in mill zone, 5.40c.
(27) Bar mill sizes.
(28) Bonderized.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝ in.; 7.375c, for widths ⅝ in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) 14 Ga., 48 in.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 13 Ga. & lighter; 60" & narrower.
(39) 48" and narrower.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½ in. and smaller rounds, 9.65c, over 3½ in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Ambridge, Pa. N2	+12.25	....	+5.75	....	+3.25	....	+1.75	....	+1.75	....	+2	....	0.5	....
Lorain, O. N3	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25
Youngstown Y1	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

ELECTRICWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+12.25	+28.75	+5.75	+23.5	+3.25	+21	+1.75	+19.5	+1.75	+19.5	+2	+19.75	0.5	+17.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Alton, Ill. L1	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Benwood, W. Va. W10	1.5	+27	+10.5	+36	+21	+45.5	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Butler, Pa. F6	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Fairless, Pa. N3	....	....	....	....	....	....	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Fontana, Calif. K1	....	....	....	....	....	....	+10.75	+28	+7.75	+24	+4.25	+19.5	+1.75	+18.25
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	1.25	+16	4.25	+12	7.75	+7.5	10.25	+6.25
Lorain, O. N3	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sharon, Pa. S4	4.5	+24	+8.5	+34	+19.5	+44	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Sparrows Pt., Md. B2	2.5	+26	+10.5	+36	+21.5	+46	0.25	+17	3.25	+13	6.75	+8.5	9.25	+7.25
Wheatland, Pa. W9	4.5	+24	+8.5	+34	+19.5	+44	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25
Youngstown R2, Y1	....	....	....	....	....	....	2.25	+15	5.25	+11	8.75	+6.5	11.25	+5.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.75		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Alton, Ill. L1	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Benwood, W. Va. W10	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Etna, Pa. N2	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Fairless, Pa. N3	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Fontana, Calif. K1	+1.25	+17.25	+0.75	+16.75	0.75	+16.5	0.75	+16.5	+9.75	+27.5	+9.75	+27.5
Indiana Harbor, Ind. Y1	10.75	+5.25	11.25	+4.75	12.75	+4.5	12.75	+4.5	2.25	+15.5	2.25	+15.5
Lorain, O. N3	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sharon, Pa. M6	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	....	....	....	....
Sparrows Pt., Md. B2	9.75	+6.25	10.25	+5.75	11.75	+5.5	11.75	+5.5	1.25	+16.5	1.25	+16.5
Wheatland, Pa. W9	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5
Youngstown R2, Y1	11.75	+4.25	12.25	+3.75	13.75	+3.5	13.75	+3.5	3.25	+14.5	3.25	+14.5

*Galvanized pipe discounts based on price of zinc at 13.00c, East St. Louis.

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	Rerolling—Ingot	Rerolling—Slabs	Forging Billets	H.R. Strip	H.R. Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	22.75	25.00	....	36.00	....	43.50	39.25	48.50	45.00
202	24.75	28.25	37.75	30.00	42.25	44.50	40.00	40.25	49.25
301	24.00	26.00	38.75	37.25	43.50	46.00	41.25	51.25	47.50
302	26.25	29.50	39.50	40.50	44.25	46.75	42.25	52.00	52.00
302B	26.50	30.75	42.25	45.75	46.75	49.00	44.50	57.00	57.00
303	....	33.25	42.50	....	47.25	49.75	45.00	56.75	56.75
304	28.00	31.25	42.00	43.75	47.00	49.50	45.75	55.00	55.00
304L	....	....	49.75	51.50	54.75	57.25	53.50	62.75	62.75
305	29.50	34.75	44.00	47.50	47.00	49.50	46.25	58.75	58.75
308	32.00	36.25	49.00	50.25	54.75	57.75	55.25	63.00	63.00
309	41.25	47.50	60.00	64.50	66.25	69.50	66.00	80.50	80.50
310	51.50	59.50	81.00	84.25	89.75	94.50	87.75	96.75	96.75
314	....	....	80.50	....	89.75	94.50	87.75	....	104.25
316	41.25	47.50	64.50	68.50	71.25	75.75	71.75	80.75	80.75
316L	....	....	72.25	76.25	79.50	83.50	79.50	88.50	88.50
317	49.75	58.00	79.75	88.25	89.50	94.25	88.50	101.00	101.00
321	33.50	38.00	48.75	53.50	54.50	57.50	54.75	65.00	65.50
330	....	....	123.25	....	113.00	143.75	135.00	149.25	149.25
18-8 CbTa	38.50	48.25	57.75	63.50	63.75	67.25	64.75	79.25	79.25
403	....	....	29.25	....	33.25	35.00	30.00	40.25	40.25
405	20.25	26.50	30.75	36.00	34.75	36.50	32.50	46.75	46.75
410	17.50	19.50	29.25	31.00	33.25	35.00	30.00	40.25	40.25
416	....	....	29.75	....	33.75	35.50	31.25	48.25	48.25
420	....	31.50	35.50	41.75	40.75	42.75	40.25	62.00	62.00
430	17.75	19.75	29.75	32.00	33.75	35.50	31.00	40.75	40.75
430F	....	....	30.50	....	34.25	36.00	31.75	51.75	51.75
431	....	29.75	39.25	....	43.50	46.00	41.00	56.00	56.00
446	....	....	40.75	59.00	46.00	48.25	42.75	70.00	70.00

Producers Are: Allegheny Ludlum Steel Corp.; American Steel & Wire Div., U. S. Steel Corp.; Anchor Drawn Steel Co., division of Vanadium-Alloys Steel Co.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; A. M. Byers Co.; Calstrip Steel Corp.; G. O. Carlson Inc.; Carpenter Steel Co.; Carpenter Steel Co. of New England; Charter Wire Products; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Firth Sterling Inc.; Fort Wayne Metals Inc.; Green River Steel Corp., subsidiary of Jessop Steel Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Ellwood Ivins Steel Tube Works Inc.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Stainless & Strip Div., Jones & Laughlin Steel Corp.; Joslyn Stainless Steels, division of Joslyn Mfg. & Supply Co.; Latrobe Steel Co.; Lukens Steel Co.; Maryland Fine & Specialty Wire Co. Inc.; McLouth Steel Corp.; Metal Forming Corp.; Midvale-Heppenstall Co.; National Standard Co.; National Tube Div., U. S. Steel Corp.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Riverside-Alloy Metal Div., H. K. Porter Company Inc.; Rodney Metals Inc.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Standard Tube Co., Superior Steel Div., Copperweld Steel Co.; Superior Tube Co.; Swepco Tube Corp.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co., subsidiary of Crucible Steel Co. of America; Tube Methods Inc.; Ulbrich Stainless Steel Inc.; Union Steel Corp.; U. S. Steel Corp.; Universal Cyclops Steel Corp.; Vanadium-Alloys Steel Co.; Wall Tube & Metal Products Co.; Wallingford Steel, subsidiary of Allegheny Ludlum Steel Corp.; Washington Steel Corp.; Seymour Mfg. Co.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets—Carbon Base 20%
Stainless					
302	....	....	....	....	37.50
304	26.05	28.80	31.55	34.30	39.75
304L	30.50	33.75	36.95	40.15	....
316	38.20	42.20	46.25	50.25	58.25
316L	42.30	46.75	51.20	55.65	....
316 Cb	49.90	55.15	60.40	65.65	....
321	31.20	34.50	37.75	41.05	47.25
347	36.90	40.80	44.65	48.55	57.00
405	22.25	24.60	26.90	29.25	....
410	20.55	22.70	24.85	27.00	....
430	21.20	23.45	25.65	27.90	....
Inconel	49.80	61.35	72.80	84.40	....
Nickel	43.20	55.05	66.95	78.90	....
Nickel, Low Carbon	43.50	55.70	67.95	80.35	....
Monel	44.25	55.35	66.45	77.60	....

	Strip, Carbon Base—Cold Rolled—10%	Both Sides
Copper*	36.80	44.20

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22; Coatesville, Pa. L7; New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Reg. Carbon (W-1)	0.330	Hi-Carbon-Cr (D-11)	0.955
Spec. Carbon (W-1)	0.385	V-Cr Hot Work (H-13)	0.550
Oil Hardening (O-1)	0.505	W-Cr Hot Work (H-12)	0.530
V-Cr Hot Work (H-11)	0.505	W Hot Wk (H-21)	1.425-1.44

Grade by Analysis (%) W	Cr	V	Co	Mo	AISI Designation	$ per lb
18	4	1	....	...	T-1	1.840
18	4	2	....	...	T-2	2.005
13.5	4	3	....	...	T-3	2.105
18.25	4.25	1	4.75	...	T-4	2.545
18	4	2	9	...	T-5	2.915
20.25	4.25	1.6	12.95	...	T-6	4.330
13.75	3.75	2	5	...	T-8	2.485
1.5	4	1	....	8.5	M-1	1.200
6.4	4.5	1.9	....	5	M-2	1.345
6	4	3	....	6	M-3	1.590

Tool steel producers include: A4, A8, B2, B8, C4, C9, C12, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

Prices in dollars per gross ton, f.o.b. (rail) furnace; add 50 cents when shipped by truck. Minimum delivered prices are approximate and based on rail shipment.

	Basic	No. 2 Foundry	Malle-able	Besse-mer
Birmingham District				
Birmingham R2	62.00	62.50**	....	....
Birmingham U6	....	62.50**	66.50	....
Woodward,Ala. W15	62.00*	62.50**	66.50	....
Cincinnati, deld.	....	70.20	....	....
Buffalo District				
Buffalo H1, R2	66.00	66.50	67.00	67.50
N.Tonawanda,N.Y. T9	....	66.50	67.00	67.50
Tonawanda,N.Y. W12	66.00	66.50	67.00	67.50
Boston, deld.	77.29	77.79	78.29	....
Rochester,N.Y., deld.	69.02	69.52	70.02	....
Syracuse,N.Y., deld.	70.12	70.62	71.12	....
Chicago District				
Chicago I-3	66.00	66.50	66.50	67.00
S.Chicago R2	66.00	66.50	66.50	67.00
S.Chicago,Ill. W14	66.00	....	66.50	67.00
Milwaukee, deld.	69.02	69.52	69.52	70.02
Muskegon,Mich., deld.	....	74.52	74.52	....
Cleveland District				
Cleveland R2, A7	66.00	66.50	66.50	67.00
Akron,Ohio, deld.	69.52	70.02	70.02	70.52
Mid-Atlantic District				
Birdsboro,Pa. B10	68.00	68.50	69.00	69.50
Chester,Pa. P4	Nom.	Nom.	Nom.	....
Swedeland,Pa. A3	68.00	68.50	69.00	69.50
NewYork, deld.	....	75.50	76.00	....
Newark,N.J., deld.	72.69	73.19	73.69	74.19
Philadelphia, deld.	70.41	70.91	71.41	71.99
Troy,N.Y. R2	68.00	68.50	69.00	69.50
Boston, deld.	75.20	75.70	76.20	76.70
Pittsburgh District				
NevilleIsland,Pa. P6	66.00	66.50	66.50	67.00
Pittsburgh (N&S sides), Aliquippa, deld.	....	67.95	67.95	68.48
McKeesRocks,Pa., deld.	....	67.60	67.60	68.13
Lawrenceville,Homestead, Wilmerding,Monaca,Pa., deld.	....	68.26	68.26	69.79
Verona,Trafford,Pa., deld.	68.29	68.82	68.82	69.35
Brackenridge,Pa., deld.	68.60	69.10	69.10	69.63
Midland,Pa. C18	66.00	....	....	....
Youngstown District				
Hubbard,Ohio Y1	....	....	66.50	....
Sharpsville,Pa. S6	66.00	....	66.50	67.00
Youngstown Y1	....	....	66.50	....
Mansfield,Ohio, deld.	71.30	....	71.80	72.30
Duluth I-3	66.00	66.50	66.50	67.00
Erie,Pa. I-3	66.00	66.50	66.50	67.00
Fontana,Calif. K1	75.00	75.50	....	....
Geneva,Utah C11	66.00	66.50	....	....
GraniteCity,Ill. G4	67.90	68.40	68.90	....
Ironton,Utah C11	66.00	66.50	....	....
Minnequa,Colo. C10	68.00	68.50	69.00	....
Rockwood,Tenn. T3	62.00	62.50‡	66.50	67.00
Toledo,Ohio I-3	66.00	66.50	66.50	67.00
Cincinnati, deld.	72.94	73.44	....	....

*Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.
**Phos. 0.70-0.90%; Phos. 0.30-0.69%, $63.50.
‡Phos. 0.50% up; Phos. 0.30-0.49%, $63.50.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.01-6.50% silicon; add 75c for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,Ohio I-3, J1	$78.00
Buffalo H1	79.25

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$99.00
NiagaraFalls,N.Y. P15	99.00
Keokuk,Iowa Open-hearth & Fdry, K2	89.00
Keokuk,Iowa O.H. & Fdry, 12⅛ lb piglets, 16% Si, K2	92.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Birdsboro,Pa. B10 (Phos. 0.075% max)	$73.00
Lyles,Tenn. T3 (Phos. 0.035% max)	73.00
Rockwood,Tenn. T3 (Phos. 0.035% max)	73.00
Buffalo H1 (Intermediate) (0.036-0.075% max)	71.50
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	71.00
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max).	71.00
Swedeland,Pa. A3 (Intermediate) (Phos. 0.036-0.075% max)	73.00
Troy,N.Y. R2 (Phos. 0.075% max)	73.00

Steel Service Center Products

Representative prices, cents per pound, f.o.b. warehouse, for 2000 lb items (except stainless) ordered by themselves. Prices will vary with total weight of the order or weight of the individual items or both. Base quantities for stainless sheets: 8000 lb, except in Chicago, New York, Boston, Los Angeles, and San Francisco, 10,000 lb. City delivery charges are 15 cents per 100 lb except; Denver, 20 cents; Baltimore, Boston, New York, Philadelphia, San Francisco, 10 cents; Atlanta, Birmingham, Dallas, Houston, Los Angeles, Seattle, no charge.

	SHEETS				STRIP	BARS			STRUCTURAL	PLATES	
	Hot Rolled	Cold Rolled	Galv.	Stainless Type 302	Hot Rolled	H.R. Rounds	C.F. Rounds	H.R. Alloy 4140	SHAPES	Carbon	Floor
Atlanta	9.37	10.61	11.83	....	10.85	9.53	13.24	....	9.94	9.73	11.16
Baltimore	8.27	8.66	10.06	....	8.28	8.95	11.80	16.38	9.53	8.84	10.43
Birmingham	9.43	10.20	10.46	....	10.41	8.26	13.14	16.76	8.47	8.41	10.05
Boston	9.67	10.58	11.77	53.50	12.16	9.77	13.35	16.59	10.16	9.62	11.08
Buffalo	8.80	9.95	11.15	55.98	10.65	9.00	11.45	16.30	9.65	9.00	10.85
Charlotte, N. C.	9.87	11.22	11.34	....	10.86	9.67	12.68	....	9.88	9.82	11.46
Chicago	8.57	10.20	10.15	52.00	10.74	8.55	10.65	15.95	8.91	8.41	10.68
Cincinnati	8.74	10.26	10.20	65.30	11.06	8.87	11.53	16.27	9.47	8.79	11.01
Cleveland	8.57	9.98	11.24	56.18	10.86	8.66	11.25	16.06	9.30	8.65	10.92
Dallas	9.62	10.43	12.59	....	11.18	9.03	12.98	16.95	9.26	9.35	11.00
Detroit	8.83	10.46	10.50	52.00	11.11	8.86	11.01	16.23	9.47	8.78	10.94
Denver	9.41	11.77	12.11	....	9.86	10.10	11.47	....	10.02	9.69	11.83
Houston	9.22	10.03	12.19	52.00	10.78	8.63	13.10	16.55	8.86	8.95	10.60
Indianapolis	9.01	10.64	10.59	....	11.18	8.99	11.09	16.39	9.35	8.85	11.12
Kansas City	9.21	10.87	11.35	....	10.87	9.31	11.57	15.72	9.80	9.10	....
Los Angeles	9.59	11.29	12.20	61.27	11.29	9.67	14.20	17.35	10.54	9.82	11.79
Memphis, Tenn.	9.84	10.05	....	....	11.24	9.92	12.74	....	10.33	10.12	11.41
Milwaukee	8.71	10.34	10.29	....	10.88	8.69	10.89	16.09	9.13	8.55	10.82
Moline, Ill.	9.21	10.70	11.45	....	10.90	9.34	11.15	16.45	9.83	9.17	10.96
Newark, N. J.	9.36	10.13	11.35	....	11.46	9.74	13.25	16.49	10.20	9.51	11.05
New York	9.36	10.13	11.35	52.98	11.46	9.74	13.25	16.40	10.20	9.51	11.05
Philadelphia	8.85	10.00	10.89	52.71	10.85	9.25	11.95	16.38	9.45	9.20	10.45
Pittsburgh	8.57	9.98	11.13	52.00	10.84	8.55	11.25	15.95	8.91	8.41	10.68
Portland, Oreg.	10.20	12.05	12.35	....	12.20	10.20	16.65	17.80	10.80	10.35	12.50
St. Louis	8.77	10.58	10.53	....	10.94	8.77	11.28	16.33	9.14	8.62	10.91
St. Paul	8.84	9.59	10.84	....	11.01	8.82	11.49	16.54	9.18	8.68	10.44
San Francisco	10.17	11.69	11.45	54.00	11.78	10.07	15.10	17.25	10.49	10.38	12.47
Seattle	10.51	11.57	12.50	54.02	11.95	9.94	16.20	17.80	10.65	10.10	12.73
Spokane, Wash.	10.36	11.42	12.35	54.02	11.80	9.79	16.20	17.80	10.50	9.95	12.58

Specifications: Hot rolled sheet, sheared edge, 10 Ga. & 36 x 96-120 in.; cold rolled sheets, 20 Ga. & 36 x 96-120 in.; galvanized sheets, 10 Ga. x 36 x 120 in. except Dallas and Houston, 10 Ga. x 48 x 120 in.; stainless, 16 Ga. x 36 in.; hot rolled strip, ⅛ in. x 1 in.; hot rolled carbon bars, rounds, ¾ in.—1¼ in., M1020; cold finished bars, 1 in., C1018; hot rolled alloy bars, 4140 annealed, 1⅝ in.—2⅞ in. rounds; structural shapes, I beams, 6 x 12½ in.; carbon plates, sheared, through ½ in. x 84 in.; floor plates, ¼ in. x 36 in.

Refractories

Fire Clay Brick (per 1000 pieces*)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beech Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Winburne, Snow Shoe, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parrall, Portsmouth, Ohio, Ottawa, Ill., Stevens Pottery, Ga., Canon City, Colo., $140; Salina, Pa., $145; Niles, Ohio, $138; Cutler, Utah, $175.

Super-Duty: Ironton, Ohio, Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Winburne, Snow Shoe, Pa., New Savage, Md., St. Louis, $185; Stevens Pottery, Ga., $195; Cutler, Utah, $248.

Silica Brick (per 1000 pieces*)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, Ohio, Hawstone, Pa., St. Louis, $158; Warren, Niles, Windham, Ohio, Hays, Latrobe, Morrisville, Pa., $163; E. Chicago, Ind., Joliet, Rockdale, Ill., $168; Canon City, Colo., $173; Lehi, Utah, $183; Los Angeles, $185.

Super-Duty: Sproul, Hawstone, Pa., Niles, Warren, Windham, Ohio, Leslie, Md., Athens, Tex., $158; Morrisville, Hays, Latrobe, Pa., $163; E. Chicago, Ind., St. Louis, $168; Canon City, Colo., $183; Curtner, Calif., $185.

Semisilica Brick (per 1000 pieces*)

Woodbridge, N. J., Canon City, Colo., $140; Philadelphia, Clearfield, Pa., $145.

Ladle Brick (per 1000 pieces*)

Dry-Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, Ohio, $96.75; Clearfield, Pa., Portsmouth, Ohio, $102.

High-Alumina Brick (per 1000 pieces*)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., Danville, Ill., $253; Philadelphia, $265; Clearfield, Pa., $230; Orviston, Snow Shoe, Pa., $260.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $310; Danville, Ill., $313; Clearfield, Orviston, Snow Shoe, Pa., $320; Philadelphia, $325.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $350; Danville, Ill., $353; Clearfield, Orviston, Snow Shoe, Pa., $360; Philadelphia, $365.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $188; Ottawa, Ill., $205.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, St. Charles, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, Gibsonburg, Narlo, Ohio, $16.75; Thornton, McCook, Ill., $17; Dolly Siding, Bonne Terre, Mo., $15.00.

Magnesite (per net ton)

Domestic, dead-burned, ½ in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅜ in. grains with fines: Baltimore, $73.

*—9 in. x 4½ x 2.50 straights.

Fluorspar

Metallurgical grades, f.o.b. shipping point in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net ton, f.o.b. cars point of entry, duty paid, metallurgical grade; European, $30-$33, contract; Mexican, all rail, duty paid, $28-$28.50; barge, Brownsville, Tex., $30-$31.

Ores

Lake Superior Iron Ore

(Prices effective for the 1960 shipping season, subject to later revision, gross ton, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old Range bessemer	11.85
Old Range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 1, 1960, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, concentrates	nom.

Foreign Iron Ore

Cents per unit

Swedish basic, 65%, c.i.f. Atlantic ports	23.00†
Chilean, 72-75%, c.i.f. Atlantic ports	22.00
Brazilian, 68.5%, f.o.b. vessel, Victoria, per ton	$11.50

Tungsten Ore

Net ton, unit

Foreign wolframite, good commercial quality	$19.75-20.00
Domestic, concentrates, f.o.b. milling points	22.00-23.00

*Before duty. †Nominal.

Manganese Ore

Mn 46-58%, Indian, 85-90c, nom. per long ton unit, c.i.f. U. S. ports, duty for buyer's account.

Chrome Ore

Gross ton, f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$34.00-35.00†
48% no ratio	25.00-26.00†
South African Transvaal	
44% no ratio	18.75†
48% no ratio	24.00-26.00†
Turkish	
48% 3:1	36.00-37.00†
Domestic	
Rail nearest seller	
18% 3:1	30.00

Molybdenum

Sulfide concentrate, per lb of Mo content, mines, unpacked	$1.23

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	$2.50-2.80
60-65%	2.80-3.20

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

†Nominal.

Canadian Steel

(Cents per pound, f.o.b. mill, except as otherwise noted)

Billets, Blooms & Slabs:	
Carbon, Forging Quality (net ton)	$97.00
Alloy (net ton)	115.00
Wire Rods:	
Carbon ⅜" to under ¼ in.	5.30
Carbon, ¼ in. to 47/64 in.	5.70
Alloy	6.40
Wire (Carload lots)	8.40
Bars & Small Shapes:	
Carbon, merchant quality	5.40
Carbon, special quality	5.85
Alloy	6.40
Bar Mill Bands:	
Carbon	5.40
Alloy	8.05
Structural Size Angles & Zees	5.40
Plates:	
Carbon	5.45
Sheets & Coils, Hot Rolled:	
Carbon Sheets	5.00
Carbon Strip	5.00
Sheets & Coils, Cold Rolled:	
Carbon Sheets	6.35
Carbon Strip (0.080 and lighter)	6.35
Carbon Strip (0.081 and heavier)	6.65
Sheets & Coils, Galvanized:	
Standard Quality	6.70
Culvert Quality	7.00
Sheets, Porcelain Enameling	7.45
Sheets & Coils, Electrical:	
Field Grade	9.00
Armature Grade	9.50
Electrical Grade	10.15
Tin Mill Products (Per Base Box; 100 lb basis wt)	
Coke Tin Plate (1.25 lb pot yield)	$10.60
Electrolytic Tin Plate (0.25 lb coating)	9.10
Black Plate	8.30
Nails, c.l. lots (per keg)	
400 keg min.	$8.15

Metal Powder

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge Iron, domestic and foreign, 98% Fe, min. trucklots, freight allowed east of Mississippi River:	
100 mesh, bags	11.50
100 mesh, pails	9.85‖
40 mesh, bags	8.10††
Electrolytic Iron,	
Melting stock, 99.87% Fe, irreg. fragments, ⅛ in. x 1.3 in.	28.75
(In contract lots of 750 tons price is 22.75c)	
Annealed, 99.5% Fe	36.75, ton, del. east of Mississippi.
Unannealed (99+% Fe)	33.0
Unannealed (99+% Fe) (minus 325 mesh)	58.0
Carbonyl Iron: 90-99.9%, 3 to 20 microns, depending on grade, 88.00-700.00 in standard 200-lb containers; all minus 200 mesh.	
Aluminum: Atomized, 500-lb drum freight allowed, c.l. 39.80; ton lots 41.80	
Brass, 80/20, leaded (60 mesh)	39.90
Bronze, filter powder, 90/10	47.00*
Copper, all types	15.25*
Lead	7.50*
Manganese, minus 35 mesh	$1.00
Nickel	$0.95-$1.15
Nickel-Silver	61.70
Solder	15.00*
Stainless Steel, 304	89.00
Stainless Steel, 316	$1.07
Steel, AISI 4650	32.00
Tin	14.00*
Zinc	25.90
Tungsten: Carbon reduced, 98.8% min., minus 65 mesh	Dollars nom.**
Molybdenum	4.35

*Plus cost of metal. ‡Depending on mesh. ‖Cutting and scarfing grades. **Depending on price of ore. ††Welding grade.

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, Pa., furnace	$14.75-15.25
Connellsville, Pa., foundry	18.00-18.50

Oven Foundry

Birmingham, ovens	$30.35
Cincinnati, deld.	33.34
Buffalo, ovens	32.00
Chattanooga, Tenn., ovens	30.80
Detroit, ovens	32.00
Pontiac, Mich., deld.	33.95
Saginaw, Mich., deld.	35.53
Erie, Pa., ovens	32.00
Everett, Mass., ovens: New England, deld.	33.55*
Indianapolis, ovens	31.25
Linton, Ohio, ovens	30.50
Cincinnati, deld.	33.54
Kearny, N. J., ovens	31.25
Milwaukee, ovens	32.00
Neville Island (Pittsburgh), Pa., ovens	30.75
Painesville, Ohio, ovens	32.00
Cleveland, deld.	34.19
Philadelphia, ovens	31.00
St. Louis, ovens	33.00
St. Paul, ovens	31.25
Chicago, deld.	34.68
Swedeland, Pa., ovens	31.00
Terre Haute, Ind., ovens	31.25

*Within $5.15 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid; based on current ocean rates with any rise for buyer's acc't. Source of shipment: Western Europe)

	North Atlantic	Great Lakes	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$5.75	$5.65	$5.65	$5.50	$5.85
Bar Size Angles	5.85	5.75	5.75	5.60	5.95
Structural Angles	5.65	5.55	5.55	5.40	5.75
I-Beams	5.60	5.50	5.50	5.35	5.70
Channels	5.60	5.50	5.50	5.35	5.70
Plates (basic bessemer)	6.00	5.90	5.90	5.75	6.10
Sheets, H.R.	Nom.	Nom.	Nom.	Nom.	Nom.
Sheets, Galvanized, 20 Ga., 36 in. x 96 in.	Nom.	Nom.	Nom.	Nom.	Nom.
Sheets, Galv. (in coils) 20 Ga., 48 in. wide	Nom.	Nom.	Nom.	Nom.	Nom.
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	25.70	25.14	24.85	24.85	26.02
Barbed Wire (†)	6.25	6.15	6.15	6.00	6.35
Merchant Bars	5.85	5.75	5.75	5.60	5.95
Hot-Rolled Bands	6.20	6.10	6.10	5.95	6.30
Wire Rods, Thomas Commercial No. 5	6.40	6.35	6.20	6.20	6.60
Wire Rods, O. H., No. 5	6.55	6.50	6.35	6.35	6.70
Bright Common Wire Nails (‖)	7.50	7.40	7.40	7.00	7.60

†Per 82 lb net reel. ‖ Per 100-lb keg, 20d nails and heavier.

Coal Chemicals

(Representative prices)

Cents per gal f.o.b. tank cars or tank trucks, plant.	
Pure benzene	31.00
Xylene, industrial grade	29.00
Creosote	24.00
Naphthalene, 78 deg.	6.00
Toluene, one deg. (deld. east of Rockies)	25.00
Cents per lb, f.o.b. tank cars or tank trucks, deld.	
Phenol, 90 per cent grade	14.75
Per net ton bulk, f.o.b. cars or trucks, plant.	
Ammonium sulfate, regular grade	$32.00

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, 10 lb pigs, per gross ton, Palmerton, Pa. 21-23% Mn, $102.50. 19-21% Mn, 1-3% Si, $100; 16-19% Mn, $98. For Neville Island, Pa., prices add $2.50 as of Feb. 1. Lump 35 lb and down: Deduct $2 from 10 lb pig prices at Palmerton.

Standard Ferromanganese: (Mn 74-76%, C 7% approx) base price per net ton, $220, Johnstown, Duquesne, Sheridan, Neville Island, Pa.; Alloy, W. Va., Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively (Min 79-81%). Lump $228 per net ton, f.o.b. Anaconda, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

High-Grade Low-Carbon Ferromanganese: (Mn 85-95%). Carload, lump, bulk, max 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 4c for max 0.15% C grade from above prices, 5.3c for max 0.03% C, 6.6c for max 0.5% C, and 8.1c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 24c per lb of contained Mn; packed, carload 25.3c, ton lot 26.9c, less ton 28.1c.

Electrolytic Manganese Metal: Min carload, bulk, 34.25c; 2000 lb to min carload, 37c; less ton, 39c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi River; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Carload ,lump, bulk, 1.50% C grade, 18.5-21% Si, 11.6c per lb of alloy. Packed, c.l. 12.8c, ton 13.25c, less ton 14.25c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Portland, Oreg. For 2% C grade, Si 16-18.5%, deduct 0.3c from above prices. For 3% grade Si 12.5-16% deduct 0.5c from above prices. Spot, add 0.25c.

TITANINUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti.; less ton to 300 lb, $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton to 300 lb $1.37. f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract min c.l. $250 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi River and north of Baltimore and St. Louis. Spot, $255.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4%). Contract, c.l. $300 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed. Spot, $305.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: C.l. lump, bulk, 28.75c per lb of contained Cr. Delivered.

Charge Chrome: Cr 50-56%, C 6-8%, Si 4-7%, 22.00c; Cr 58-63%, C 5-8%, Si 3-6%, 22.50c per lb of contained Cr, carlots, lump, bulk, delivered.

Blocking Chrome: Cr 55-63%, C 4-6%, Si 8-12%, 23.50c per lb of contained Cr, delivered in carlots, lump, bulk.

Refined Chrome: Cr 53-63%, C 3-5%, Si 2.5% max., 26.00c per lb of contained Cr, delivered in carlots, lump, bulk.

Low-Carbon Ferrochrome: Cr 63-66% (Simplex), carload, lump, bulk, C 0.025% max, 31.50c per lb contained Cr.; 0.010% max, 32.50c. Delivered.

Cr, 67-71%, carload, lump, bulk, 0.025% max, 34.50c; 0.05% max, 33.50c; 0.10% max, 33.25c; 0.20% max, 33.00c; 0.50% max, 32.75c; 1.0% max, 32.50c; 1.5% max, 32.25c; 2.0% max, 32.00c. Delivered.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). C.l., 2" x D, bulk 30.8c per lb of contained Cr. Packed, c.l. 32.4c, ton 34.2c, less ton 35.7c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). 8M x D, carload, bulk, 20.05c per lb of alloy carload packed 21.25c, ton lot 22.50c, less ton lot 23.70c. Delivered. Spot, add 0.25c.

Ferrochrome-Silicon: Cr 39-41%, Si 42-45%, C 0.05% max, 26.25c per lb contained Cr and 14.60c per lb contained Si; Cr. 33-36%, Si 45-48%, C 0.05% max, 28.25c per lb contained Cr., 14.60c per lb contained Si; 0.75 in. x down, 29.40c per lb contained Cr., 14.60c per lb contained Si.

Chromium Metal, Electrolytic: Commercial grade (C 99.8% min, metallic basis Fe 0.2% max). Contract, carlot, packed, 2" x D plate (above ⅛" thick) $1.15 per lb, ton lot $1.17, less ton lot $1.19. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open hearth grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55% or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5 freight allowed. Spot, add 5c.

SILICON ALLOYS

50% Ferrosilicon: Carload, lump, bulk, 14.6c per lb contained Si. Packed, c.l. 17.1c, ton lot 18.55c, less ton 20.20c, f.o.b. Alloy, W. Va.; Ashtabula, Marietta, O.; Chattanooga, Rockwood, Tenn.; Houston, Tex.; Sheffield, Ala.; Keokuk, Iowa; Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Carload, lump, bulk, 15.75c per lb contained silicon. Packed, c.l. 17.75c, ton lot 19.55c, less ton 20.9c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Carload, lump, bulk, 16.9c per lb of contained Si. Packed, c.l. 18.8c, ton lot 20.45c, less ton 21.7c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Carload, lump, bulk, 20c per lb of contained Si. Packed, c.l. 21.65c, ton lot 23.05c, less ton 24.1c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 1.00% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Add 0.5c for 0.50% Fe grade analyzing 98.25% min Si.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 9.85c per lb of alloy; ton lot, packed, 10.85c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l., lump, bulk, 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Carload, bulk, 26.25c per lb of alloy, carload, lump, packed 27.25c, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: 100 lb or more packed (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload, $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Carbortam: (B 1 to 2%). Lump, carload $320 per ton, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3¾ lb each and containing 2 lb of Cr). Carload, bulk 19.60c per lb of briquet, in bags 20.70c; 3000 lb to c.l. pallets 20.80c; 2000 lb to c.l. in bags 21.90c; less than 2000 lb in bags 22.80c. Delivered. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Carload, bulk 13.7c per lb of briquet; c.l., packed bags 14.9c; 3000 lb to c.l., pallets 14.9c; 2000 lb to c.l., bags 16.1c; less ton 17c. Delivered. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). C.l. bulk 14c per lb of briquet; c.l. packed, bags 15.2c; 3000 lb to c.l., pallets 15.2c; 2000 lb to c.l., bags 16.4c; less ton 17.3c. Delivered. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si and small sizes, weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 8c per lb of briquet; packed, bags 9.2c; 3000 lb to c.l., pallets 9.6c; 2000 lb to c.l., bags 10.8c; less ton 11.7c. Delivered. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.49 per lb of Mo contained, f.o.b. Langeloth, Pa.

Titanium Briquets: Ti 98.27%, $1 per lb f.o.b. Niagara Falls, N. Y.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.15 per lb (nominal) of contained W. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 4% max, C 0.1% max). Ton lots 2" x D, $3.45 per lb of contained Cb; less ton lots $3.50 (nominal). Delivered.

Ferrotantalum Columbium: (CB 44-77% approx, Ta 15% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lots 2" x D, $3.05 per lb of contained Cb plus Ta, delivered; less ton lots, $3.10.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Carload, bulk 19.25c per lb of alloy, c.l. packed ½ in. x 12 M 20.00c, ton lot 21.15c, less ton 22.40c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 20% per lb of alloy, ton lot 21.15c; less ton lot 22.4c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

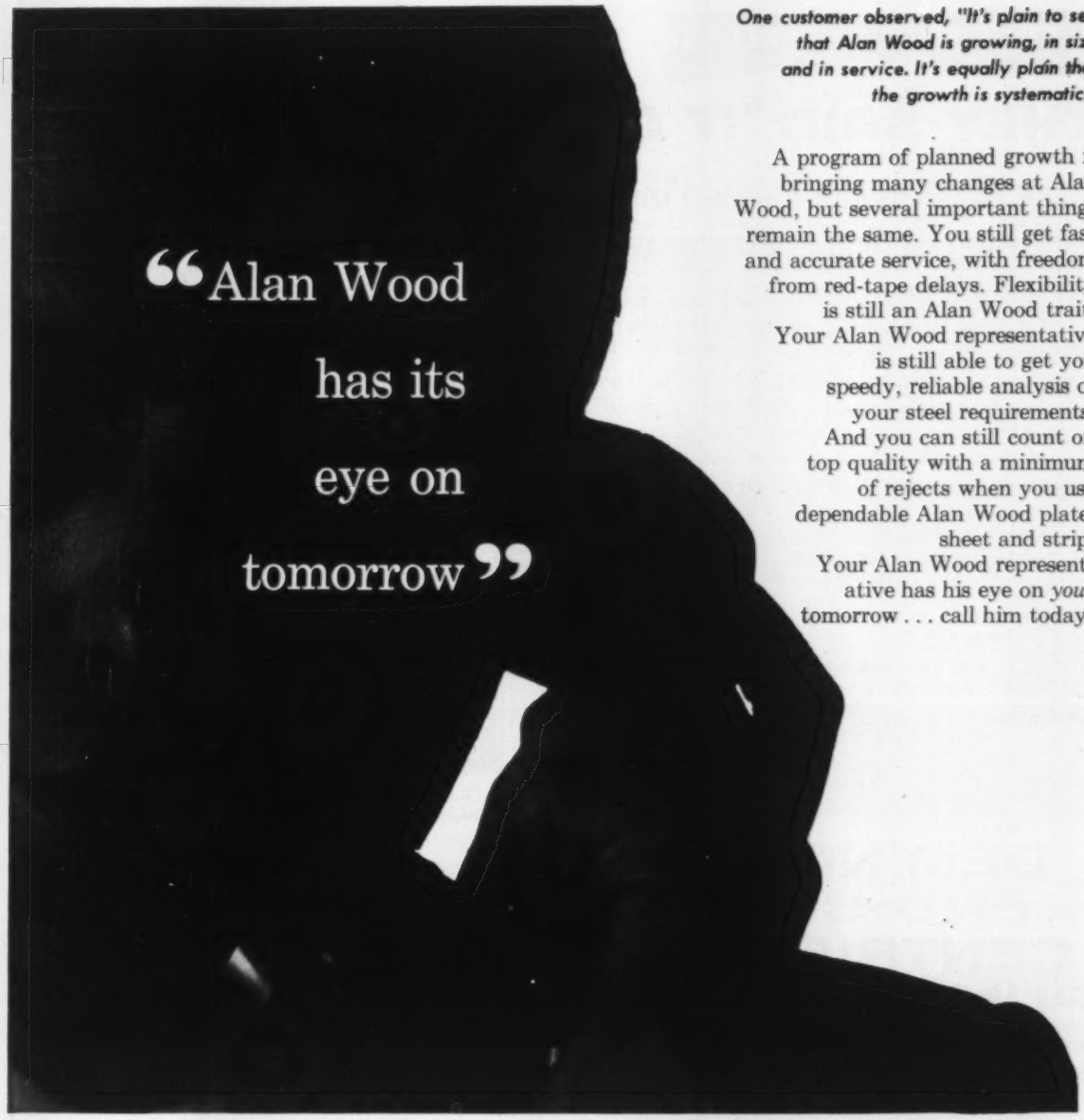
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.45c per lb of alloy; ton lot 19.95c; less ton lot 21.20c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal Fe). Lump, carload, bulk, 19.25c. Packed c.l. 20.25c; 2000 lb to c.l. 21.25c; less than 2000 lb 21.75c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $5 for each 1% of P above or below the base). Carload, bulk, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $120 per gross ton.

Ferromolybdenum: (65-75%). Per lb of contained Mo in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.76 in all sizes except powdered which is $1.82.

Technical Molybdic-Oxide: Per lb of contained Mo, in cans $1.47; in bags, $1.46, f.o.b. Langeloth and Washington, Pa.



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EXECUTIVE REPORT #21

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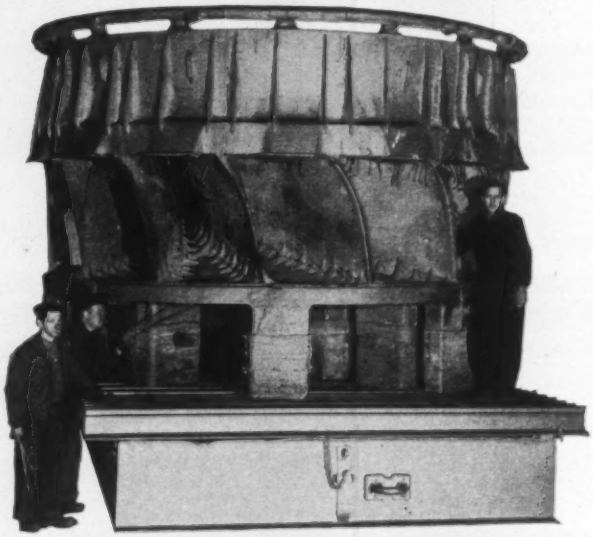
but Wheelabrator® cleaned this 100-ton casting in 20 minutes

The enormity of a casting like this would have made it one of those "impossible" cleaning jobs by manual airblasting. But a Wheelabrator Car-Type Room equipped with 8 blasting wheels takes it in stride at Canadian Steel Foundries, Ltd. Here, castings measuring 20 ft. in diameter and over 12 ft. in height are cleaned thoroughly in blast cycles of only 15 to 20 minutes in the automated Wheelabrator room.



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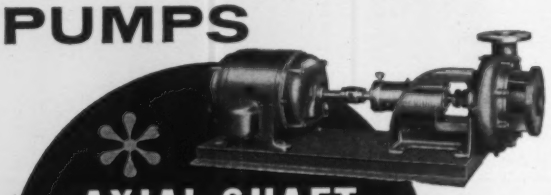
AIRLESS BLAST EQUIPMENT

DEMING END-SUCTION CENTRIFUGAL PUMPS



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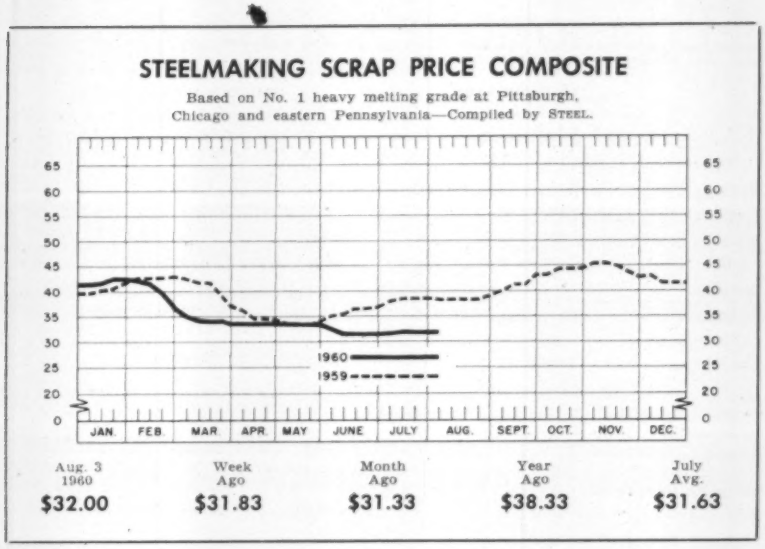


Scrap Hits New High Since June 1

STEEL's composite on No. 1 heavy melting rises 17 cents to $32 despite absence of large orders from mills. Advance anticipates improved demand for limited supplies

Scrap Prices, Page 142

● **Chicago**—Virtually all grades of scrap are up $1 to $2 a ton, completing the upsurge that started two weeks ago. Two developments confirm the stronger tone: First, 16,000 tons of No. 1 factory bundles to be produced by two auto stamping plants during August were sold on brokers' bids, ranging from $37.20 to $37.96 a gross ton on a Chicago delivered basis. Second, a large mill announced that its price for August delivery of No. 1 industrial heavy melting scrap returned from its customers will be $33, up $2 a ton over the July price.

The stronger market apparently stems from an anticipated increase in demand for scrap in the weeks ahead, although to date the district steelmaking rate is stationary.

● **Pittsburgh**—The market is firm, with most prices unchanged. Brokers for a mill on the edge of the district offered dealers the same prices for open hearth grades that were paid last month: $31 a ton for No. 1 heavy melting, delivered, and $26 for No. 2 heavy melting. Bidding on No. 1 factory bundles from the local plant of GM's Fisher Body Div. was surprisingly strong. The top price was $36.04 vs. $33.89 last month.

● **Philadelphia**—Domestic demand for scrap remains dull. Substantial export demand during the last several weeks has been the factor sustaining price levels for major open hearth grades. Rail crops, 2 ft and under, have declined $2 a ton to a range of $51-$52 while No. 1 cupola cast is $1 lower at $39.

● **New York** — Buying prices of scrap brokers are unchanged. No early improvement in tonnages taken by domestic consumers is in prospect. Export buying continues to be active.

● **Boston** — Scrap buying is slow, and cast grades are lower, notably mixed cupola cast. Fully 90 per cent of steel scrap shipped from New England is for export or eastern Pennsylvania. Domestic prices are tied closer than ever before to eastern Pennsylvania quotations. The commodity rate on scrap, from Burlington, Vt., to Boston, at $6.61 per ton is effective Aug. 22.

● **Cleveland**—No. 1 factory bundles advanced $2 a ton here to a range of $34-$35. The rise was attributed to small tonnages offered and the belief that the market was past its low point pricewise. Some price revisions have been made in railroad scrap. Brokers await the resumption of large scale buying by mills.

● **Youngstown**—The scrap market remains dull. The steel industry still awaits the long anticipated pickup in auto orders. There have been no recent changes in prices.

● **Detroit**—Mill buying interest in scrap is dormant, but prices moved higher on the comparatively small tonnages involved in the auto lists which just closed. Brokers are less pessimistic than they were and are bolstering their holdings on the expectations of improved demand next month. A small tonnage continues to flow in export channels.

● **Buffalo**—Scrap dealers here expect that August prices for mill grades will remain steady. Most observers feel the market has reached a bottom. But there is little incentive for a price upswing until mills boost operations and use more scrap.

Dealers expect only modest orders for leading mill grades during August. Supplies are ample to meet current demand. There is a continued export demand for limited tonnages of No. 1 heavy melting scrap.

● **Cincinnati**—The scrap market is expected to remain dull for the balance of August. A local and an area mill entered the market for limited tonnages and are offering the same prices they did a month ago. Inventories at mills are high, and there is little interest in acquiring new tonnages.

The undertone of the market is firm because of improvement in the industrial lists rather than mill purchases. No. 1 heavy melting is unchanged at $26.50-$27.50.

● **Houston**—The steel scrap market is still sluggish. There is a little

(*Please turn to Page* 147)

Iron and Steel Scrap

Consumer prices per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, Aug. 3, 1960. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Aug. 3	$32.00
July 27	31.83
July Avg.	31.63
Aug. 1959	38.64
Aug. 1955	43.97

Based on No. 1 heavy melting grade at Pittsburgh, Chicago, and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	30.00-31.00
No. 2 heavy melting	25.00-26.00
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	24.00-25.00
No. 1 busheling	30.00-31.00
No. 1 factory bundles	*37.00-38.00*
Machine shop turnings	13.00-14.00
Mixed borings, turnings	13.00-14.00
Short turnings	18.00-19.00
Cast iron borings	17.00-18.00
Cut structurals:	
2 ft and under	36.00-37.00
3 ft and under	35.00-36.00
Heavy turnings	27.00-28.00
Punchings & plate scrap	39.00-40.00
Electric furnace bundles	37.00-38.00

Cast Iron Grades

No. 1 cupola	38.00-39.00
Stove plate	34.00-35.00
Unstripped motor blocks	25.00-26.00
Clean auto cast	37.00-38.00
Drop broken machinery	47.00-48.00

Railroad Scrap

No. 1 R.R. heavy melt.	36.00-37.00
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Random rails	46.00-47.00
Angles, splice bars	45.00-46.00
Railroad specialties	49.00-50.00
Rails, rerolling	51.00-52.00

Stainless Steel Scrap

18-8 bundles & solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	90.00-95.00
430 turnings	50.00-55.00

CHICAGO

No. 1 hvy melt., indus.	*32.00-33.00*
No. 1 hvy melt., dealer	30.00-31.00
No. 2 hvy melting	27.00-28.00
No. 1 factory bundles	*37.00-38.00*
No. 1 dealer bundles	31.00-32.00
No. 2 bundles	*20.00-21.00*
No. 1 busheling, indus.	*32.00-33.00*
No. 1 busheling, dealer	30.00-31.00
Machine shop turnings	*14.00-15.00*
Mixed borings, turnings	*16.00-17.00*
Shovel turnings	*16.00-17.00*
Cast iron borings	*16.00-17.00*
Cut structurals, 3 ft	*35.00-36.00*
Punchings & plate scrap	*37.00-38.00*

Cast Iron Grades

No. 1 cupola	*42.00-43.00*
Stove plate	*36.00-37.00*
Unstripped motor blocks	*34.00-35.00*
Clean auto cast	*47.00-48.00*
Drop broken machinery	*47.00-48.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*35.00-36.00*
R.R. malleable	*46.00-47.00*
Rails, 2 ft and under	*49.00-50.00*
Rails, 18 in. and under	*50.00-51.00*
Angles, splice bars	*43.00-44.00*
Axles	*52.00-53.00*
Rails, rerolling	*52.00-53.00*

Stainless Steel Scrap

18-8 bundles, solids	175.00-180.00
18-8 turnings	95.00-100.00
430 bundles & solids	85.00-90.00
430 turnings	45.00-50.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*26.00-27.00*
No. 2 heavy melting	14.00-15.00
No. 1 bundles	*29.00-30.00*
No. 2 bundles	*15.50-16.50*
No. 1 busheling	*25.00-26.00*
Machine shop turnings	10.00-11.00
Mixed borings, turnings	9.00-10.00
Shovel turnings	8.00-9.00

Cast Iron Grades

No. 1 Cupola	36.00-37.00
Stove plate	30.00-31.00
Heavy breakable	30.00-31.00
Unstripped motor blocks	22.00-23.00
Charging box cast	30.00-31.00
Clean auto cast	43.00-44.00

CLEVELAND

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	23.00-24.00
No. 1 factory bundles	*34.00-35.00*
No. 1 bundles	31.00-32.00
No. 2 bundles	17.00-18.00
No. 1 busheling	31.00-32.00
Machine shop turnings	12.00-13.00
Shovel turnings	16.00-17.00
Mixed borings, turnings	16.00-17.00
Cast iron borings	16.00-17.00
Cut foundry steel	32.00-33.00
Cut structurals, plate 2 ft and under	39.00-40.00
Low phos. punchings & plate	31.00-32.00
Alloy free, short shovel turnings	17.00-18.00
Electric furnace bundles	33.00-34.00†

Cast Iron Grades

No. 1 cupola	44.00-45.00
Charging box cast	33.00-34.00
Heavy breakable cast	30.00-31.00
Stove plate	39.00-40.00
Unstripped motor blocks	32.00-33.00
Brake shoes	35.00-36.00
Clean auto cast	50.00-51.00
Burnt cast	40.00-41.00
Drop broken machinery	50.00-51.00

Railroad Scrap

R.R. malleable	*45.00-46.00*
Rails, 2 ft and under	50.00-51.00
Rails, 18 in. and under	51.00-52.00
Rails, random length	44.00-45.00
Cast steel	38.00-39.00
No. 1 railroad cast	46.00-47.00
Railroad specialties	*44.00-45.00*
Angles, splice bars	*46.00-47.00*
Rails, rerolling	53.00-54.00

Stainless Steel Scrap (Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	175.00-180.00
18-8 turnings	75.00-80.00
430 clips, bundles, solids	90.00-95.00
430 turnings	20.00-30.00

YOUNGSTOWN

No. 1 heavy melting	33.00-34.00
No. 2 heavy melting	25.00-26.00
No. 1 busheling	33.00-34.00
No. 1 bundles	33.00-34.00
No. 2 bundles	20.00-21.00
Machine shop turnings	15.00-16.00
Shovel turnings	20.00-21.00
Cast iron borings	20.00-21.00
Low phos.	35.00-36.00
Electric furnace bundles	35.00-36.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

BUFFALO

No. 1 heavy melting	29.00-30.00
No. 2 heavy melting	24.00-25.00†
No. 1 bundles	29.00-30.00
No. 2 bundles	21.00-22.00
No. 1 busheling	29.00-30.00
Shovel turnings	17.00-18.00
Machine shop turnings	12.00-13.00
Cast iron borings	15.00-16.00
Low phos. structurals and plate, 2 ft and under	39.00-40.00

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	40.00-41.00
No. 1 machinery	47.00-48.00

Railroad Scrap

Rails, random lengths	43.00-44.00
Rails, 3 ft and under	49.00-50.00
Railroad specialties	40.00-41.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	26.50-27.50
No. 2 heavy melting	22.50-23.50
No. 1 bundles	26.50-27.50
No. 2 bundles	17.50-18.50
No. 1 busheling	26.50-27.50
Machine shop turnings	10.00-11.00
Mixed borings, turnings	10.00-11.00
Shovel turnings	12.00-13.00
Cast iron borings	12.00-13.00
Low phos. 18 in.	34.00-35.00

Cast Iron Grades

No. 1 cupola	35.00-36.00
Heavy breakable cast	31.00-32.00
Charging box cast	35.00-36.00
Drop broken machinery	48.00-49.00

Railroad Scrap

No. 1 R.R. heavy melt.	31.00-32.00
Rails, 18 in. and under	51.00-52.00
Rails, random lengths	43.00-44.00

PHILADELPHIA

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	36.00
No. 2 bundles	20.00
No. 1 busheling	36.00
Electric furnace bundles	37.00
Mixed borings, turnings	17.00†
Shovel turnings	21.00
Machine shop turnings	15.00
Heavy turnings	28.00†
Structurals & plates	38.00-40.00
Couplers, springs, wheels	40.00
Rail crop, 2 ft & under	*51.00-52.00*

Cast Iron Grades

No. 1 cupola	*39.00*
Heavy breakable cast	38.00
Drop broken machinery	50.00
Malleable	46.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	31.00-32.00
No. 2 heavy melting	21.00-22.00
No. 1 bundles	31.00-32.00
No. 2 bundles	16.00-17.00
Machine shop turnings	7.00-8.00†
Mixed borings, turnings	8.00-9.00†
Shovel turnings	9.00-10.00†
Low phos. structurals & plates	38.00-39.00

Cast Iron Grades

No. 1 cupola	36.00-37.00
Unstripped motor blocks	25.00-26.00
Heavy breakable	30.00-31.00

Stainless Steel

18-8 sheets, clips, solids	165.00-170.00
18-8 borings, turnings	80.00-85.00
410 sheets, clips, solids	55.00-60.00
430 sheets, clips, solids	70.00-75.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	24.00-24.50
No. 2 heavy melting	19.00-20.00
No. 1 bundles	24.00-24.50
No. 1 busheling	24.00-24.50
Machine shop turnings	6.00-7.00
Shovel turnings	8.50-9.00
No. 1 cast	39.00-40.00
Mixed cupola cast	33.00-33.50
No. 1 machinery cast	40.00-42.00

BIRMINGHAM

No. 1 heavy melting	*28.00-29.00*
No. 2 heavy melting	*23.00-24.00*
No. 1 bundles	28.00-29.00
No. 2 bundles	*17.00-18.00*
No. 1 busheling	31.00-32.00
Cast iron borings	9.00-10.00
Machine shop turnings	18.00-19.00
Shovel turnings	20.00-21.00
Bar crops and plate	35.00-36.00
Structurals & plate	35.00-36.00
Electric furnace bundles	32.00-33.00
Electric furnace:	
3 ft and under	31.00-32.00
2 ft and under	32.00-33.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Stove plate	46.00-47.00
Unstripped motor blocks	*35.00-36.00*
No. 1 wheels	*37.00-38.00*

Railroad Scrap

No. 1 R.R. heavy melt.	28.00-29.00
Rails, 18 in. and under	45.00-46.00
Rails, random lengths	*39.00-40.00*
Angles, splice bars	39.00-40.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	31.00
No. 2 heavy melting	28.00
No. 1 bundles	33.00
No. 2 bundles	19.00
No. 1 busheling	33.00
Machine shop turnings	9.00
Shovel turnings	11.00

Cast Iron Grades

No. 1 cupola	*43.00*
Charging box cast	*36.00*
Heavy breakable cast	35.00
Unstripped motor blocks	36.00
Clean auto cast	*44.00*
Stove plate	*36.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*32.00*
Rails, random lengths	*37.00*
Rails, rerolling	48.00
Rails, 18 in. and under	41.00
Angles, splice bars	41.00

HOUSTON

(Brokers' buying prices; f.o.b. car)

No. 1 heavy melting	31.00
No. 2 heavy melting	29.00
No. 2 bundles	18.00
Machine shop turnings	11.00-12.00
Low phos. plate & structurals	38.00-39.00

Cast Iron Grades

No. 1 cupola	33.00-35.00
Heavy breakable	26.00
Foundry malleable	31.00†
Unstripped motor blocks	29.00-31.00

Railroad Scrap

No. 1 R.R. heavy melt.	34.00-35.00

LOS ANGELES

No. 1 heavy melting	32.00
No. 2 heavy melting	29.00
No. 1 bundles	27.00
No. 2 bundles	17.00
Machine shop turnings	*16.00*
Shovel turnings	15.00
Cast iron borings	16.00
Cut structurals and plate 1 ft and under	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	44.00

Railroad Scrap

No. 1 R.R. heavy melt.	32.00-34.00

PORTLAND, OREG.

(Prepared, f.o.b. car)

No. 1 heavy melting	35.00-38.00
No. 2 heavy melting	32.00-35.00
No. 2 bundles	20.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable	33.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SEATTLE

(Prepared, f.o.b. car)

No. 1 heavy melting	38.50
No. 1 hvy (unprepared)	35.00
No. 2 heavy melting	35.50
No. 2 hvy (unprepared)	33.00
No. 2 bundles	23.00
Shovel turnings	15.00
Electric furnace bundles	48.00

Cast Iron Grades

No. 1 cupola	35.00
Heavy breakable cast	36.00
Unstripped motor blocks	33.00
Stove plate (f.o.b. plant)	20.00

SAN FRANCISCO

No. 1 heavy melting	34.00
No. 2 heavy melting	30.00
No. 1 bundles	30.00
No. 2 bundles	20.00
Machine shop turnings	14.00
Mixed borings, turnings	14.00
Cast iron borings	14.00
Heavy turnings	14.00
Shovel turnings	14.00
Cut structurals, 3 ft	40.00

Cast Iron Grades

No. 1 cupola	48.00
Charging box cast	34.00
Stove plate	34.00
Heavy breakable cast	28.00
Unstripped motor blocks	31.00
Clean auto cast	40.00
Drop broken machinery	40.00
No. 1 wheels	34.00

HAMILTON, ONT.

(Brokers' buying prices; net tons)

No. 1 heavy melting	25.80
No. 2 hvy, melt, 2 ft & under	25.50
No. 1 bundles	25.80
No. 2 bundles	19.00
Mixed steel scrap	16.00
Mixed borings, turnings	12.00
Busheling, new factory: Prepared	25.50
Unprepared	20.45
Shovel turnings	12.00

Cast Iron Grades‡

No. 1 machinery cast	43.00

†Nominal.
‡F.o.b. Hamilton, Ont.

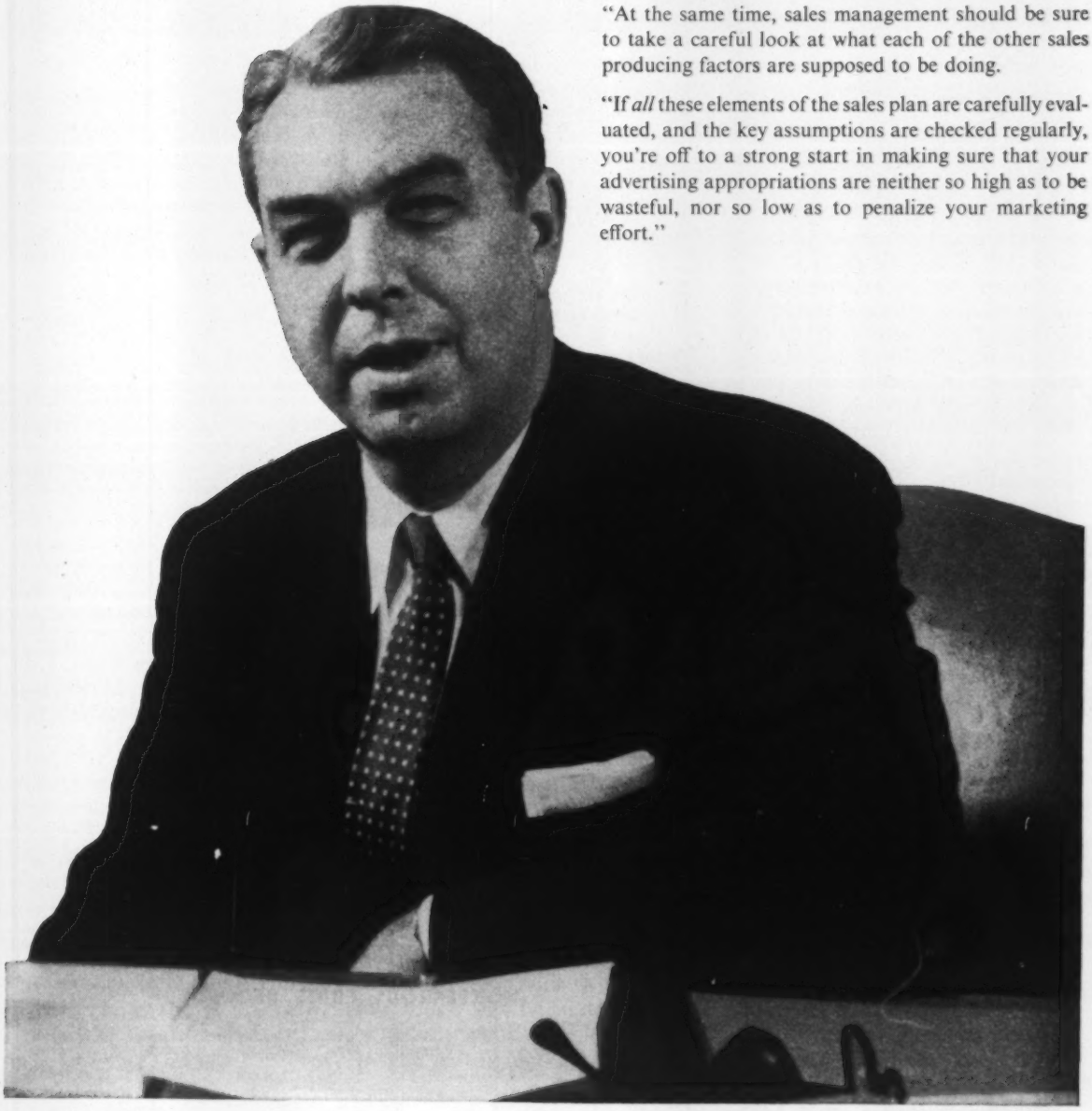
"How much is enough for advertising?"

JOHN R. SARGENT, partner in the nationally-known management consultant firm of Cresap, McCormick and Paget, points the way toward solution of one of top management's knottiest problems.

"Good sales management generally knows the crucial sales problems faced by each one of its products. Through good advertising advice plus experience, trial and error, and some judicious advertising testing, sales management also can come to have a good understanding of what advertising can and cannot do.

"At the same time, sales management should be sure to take a careful look at what each of the other sales producing factors are supposed to be doing.

"If *all* these elements of the sales plan are carefully evaluated, and the key assumptions are checked regularly, you're off to a strong start in making sure that your advertising appropriations are neither so high as to be wasteful, nor so low as to penalize your marketing effort."



AIA

ASSOCIATION OF INDUSTRIAL ADVERTISERS

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An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PHOENIX, PITTSBURGH, PORTLAND, ROCHESTER, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., TULSA, YOUNGSTOWN.

Alcoa Raises Prices; Changes 'Pig'

Nonferrous Metal Prices, Pages 146 & 147

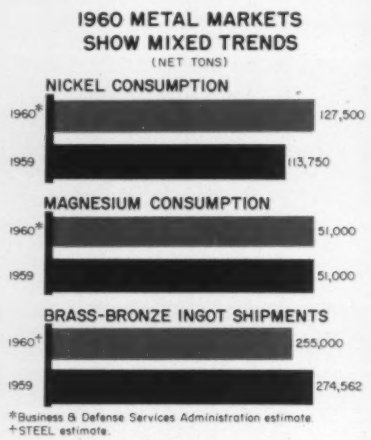
THE QUIET of the aluminum scene was shattered last week by two price moves, both initiated by Aluminum Co. of America.

In a surprise action, Alcoa announced it was upping the quoted price on most mill products by 0.5 to 0.75 cent a pound, effective Aug. 1. Before the industry had time to recover from that shock, Alcoa threw its second punch—an announcement that it was abandoning the term "pig" as a designation for primary aluminum products. Said Alcoa: "Products heretofore designated as 'pig' will now be produced by the methods formerly used for aluminum ingot. These products will have improved qualities (including improved appearance, greater internal cleanliness, and more uniform composition) available up to now only in ingot, but they will be sold at the former pig price level."

• **Obvious but Unexpected**—At the first of the year, it seemed a foregone conclusion that the aluminum industry would raise its prices on Aug. 1, when the second installment of wage hikes granted under a three year contract came due. As the year wore on, it became obvious that industry sales wouldn't increase 10 to 20 per cent over 1959's as had been forecast. Metalmen just about wrote off a price hike before yearend— if then.

Alcoa evidently took a look at its higher wage costs (11.5 cents an hour on Aug. 1) and the increased costs of production, research, and market development, and decided a price hike at this time was justified, regardless of lukewarm sales. Certainly, industry profits could stand a boost.

• **Competition Fierce**—Price fighting in aluminum mill products has prompted the conservative New York brokerage firm of F. S. Smithers & Co. to comment: "For the past two and one half years, the domestic aluminum industry has been buffeted profitwise by undisciplined and profitless price cutting of semifabricated and fabricated products. It cannot be emphasized too strongly that without price discipline, both in domestic and international markets, the progress of the industry could be slowed more from an inability to acquire the capital needed than from any possible contraction in markets due to a firmer price structure."



• **Pig Brings the Profits**—While better than half the production facilities of the U. S. primary producers are devoted to fabricated products, they make the bulk of their profits on pig and ingot sales.

The pig-ingot market has also been hit by price tremors. Actually, the higher priced ingot has virtually disappeared as a product. Producers have been selling "alloyed pig" in its place. For 26 cents a pound (the pig quotation), users can get metal with the same properties as the 28.1 cent a pound ingot. Alcoa's move to dump pig and sell only ingot at 26 cents a pound makes official what has been going on for a long time.

• **Others Will Probably Follow**—As STEEL went to press, Alcoa's competitors said they were "studying" the moves. Consensus of observers: They will go along with the higher mill product prices shortly but might hang back temporarily hoping for a flurry of orders from users wanting to lay in stocks at the old prices. It's unlikely that the increases will firm prices, but as one wag puts it: "It will at least establish a higher base for the cutting." Better sales are the only thing that will firm prices.

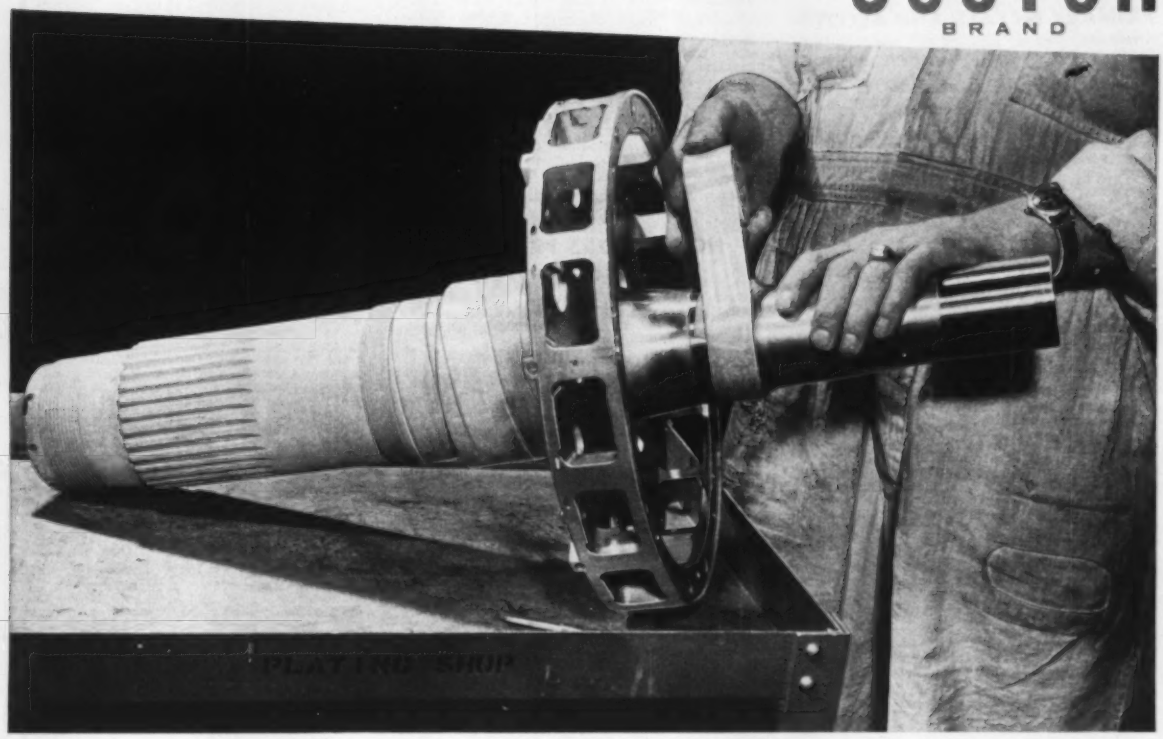
• **Output Down**—As yet, sales haven't picked up substantially. Best indication is that last week Kaiser Aluminum & Chemical Corp. closed down a 27,500 ton potline at its Chalmette, La., works to adjust plant inventories.

NONFERROUS PRICE RECORD

	Aug. 3 Price	Last Change	Previous Price	July Avg	June Avg	Aug. 1959 Avg
Aluminum	26.00	Dec. 17, 1959	24.70	26.000	26.000	24.700
Copper	33.00	Mar. 10, 1960	33.00-35.00	33.000	33.000	30.010
Lead	11.80	Dec. 21, 1959	12.30	11.800	11.800	12.069
Magnesium	35.25	Aug. 13, 1956	33.75	35.250	35.250	35.250
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	74.000
Tin	104.50	Aug. 3, 1960	104.625	103.565	101.394	102.333
Zinc	13.00	Jan. 8, 1960	12.50	13.000	13.000	11.000

Quotations in cents per pound based on: COPPER, mean of primary and secondary, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary pig, 99.5+%, f.o.b. customer custody; MAGNESIUM, pig, 99.8%, Velasco, Tex.

SCOTCH
BRAND



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Tape masks off difficult areas easily . . . for positive plating protection

Speed up and simplify your plating operations with "SCOTCH" BRAND Plastic Tape No. 470. Sticks at a touch. Conforms to most shapes. Safely seals off areas not to be plated and eliminates "creeping under" action. Results in clean, sharp-line plating.

"SCOTCH" Plastic Tape No. 470 ends costly machining time needed to reduce excess build-up that often results when other masking agents are used. 470's tough vinyl plastic backing withstands the effects of acids, alkaline solutions, most hydrocarbons, and other solvents used in plating operations.

What's your plating problem? Chances are your nearest "SCOTCH" BRAND Tape Distributor can solve it for you. Ask him, or write: 3M Co., 900 Bush Avenue, St. Paul 6, Minn.

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Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99.5%, pigs, 26.00; ingots, 26.00-28.10, 30,000 lb or more, f.o.b. customer custody.

Aluminum Alloy: No. 13, 25.90; No. 43, 26.20; No. 195, 30.70; No. 214, 31.50; No. 356, 26.80, 50 lb ingots.

Antimony: R.M.M. brand, 99.5%, 29.00; Lone Star brand, 29.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 25.00-26.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97% lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $65 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.75% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment data, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.50 per lb deld.

Cobalt: 99+%, $1.50 per lb for 500-lb keg, $1.52 per lb for 100 lb case; $1.57 per lb under 100 lb.

Columbium: Powder, $55-85 per lb nom.

Copper: Electrolytic, 33.00 deld.; custom smelters, 33.00; lake, 33.00 deld.; five refined, 32.75 deld.

Germanium: First reduction, ingots, less than 1 kg, 36.00-37.50 per gram; 1-10 kg, 30.50-32.00 per gram; 10 kg or more, 28.10-29.99 per gram; intrinsic grade, under 10 kg, 31.95 per gram; 10 kg or more, 29.95 per gram.

Gold: U. S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $70-75 per troy oz nom.

Lead: Common, 11.80; chemical, 11.90; corroding, 11.90, St. Louis, New York basis, add 0.20.

Lithium: 1 lb or 2 lb ingots, less than 24 lb, $11 per lb f.o.b. Minneapolis; 24-99 lb, $9.50; 100-499 lb, $9.25; 450 lb or more, $9 per lb, delivered.

Magnesium: Pig, 35.25; ingot, 36.00 f.o.b. Velasco, Tex., 1.3 in. diam. x 12 in. sticks, 57.00 f.o.b. Madison, Ill.

Magnesium Alloy: AZ91A (diecasting), 40.75; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $210-212 per 75 lb flask.

Molybdenum: Unalloyed forging billets, 4.125-7.0 in. diam., 50-4999 lb, $8.15-11.50 per lb, depending on quantity; 5000 lb or more, $8 per lb, f.o.b. Coldwater, Mich.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot for addition to cast iron, in kegs, 74.50; "F" nickel, 5 lb ingots, 75.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01. Nickel oxide sinter at Buffalo, New York, or other established U. S. ports of entry, contained nickel, 69.60.

Osmium: $70-90 per troy oz nom.

Palladium: $24-26 per troy oz.

Platinum: $82-85 per troy oz from refineries.

Radium: $16-21.50 per mg radium content, depending on quantity.

Rhodium: $137-140 per troy oz.

Ruthenium: $45-50 per troy oz.

Selenium: $6.50-7 per lb, commercial grade.

Silver: Open market, 91.375 per troy oz.

Sodium: Solid pack, c.l., 19.50; l.c.l., 20.00; brick, c.l., 21.00; l.c.l., 21.50; tank car 17.00.

Tantalum: Melting stock, $35 per lb; rod, $60 per lb nom; sheet, $55 per lb nom.

Tellurium: $3.50 per lb, 100 lb or more.

Thallium: $7.50 per lb.

Tin: Straits, N. Y., spot and prompt, 104.50.

Titanium: Sponge, 99.3+% grade A-1, ductile (0.3% Fe max.), $1.60 per lb; grade A-2 (0.5% Fe max.), $1.50 per lb.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $2.75-2.90 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $3.35-4.50.

Zinc: Prime western, 13.00; brass special, 13.25; intermediate, 13.00, East St. Louis, freight allowed over 0.50 per lb, New York basis, add 0.50. High grade, 14.35; special high grade, 14.50 deld. Diecasting alloy ingot No. 3, 16.25; No. 2, 16.75; No. 5, 16.50 deld.

Zirconium: Reactor grade sponge, 100 lb or less, $8 per lb; 100-500 lb, $7 per lb; over 500 lb, $6.50 per lb.

(Note: Chromium, manganese, and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys 26.25-28.00; No. 12 foundry alloy (No. 2 grade), 23.75-24.25; 5% silicon alloy, 0.60 Cu max., 25.00-25.25; 13 alloy, 0.60 Cu max., 25.00-25.25; 195 alloy, 26.75-27.75; 108 alloy, 24.25-24.75. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 25.00; grade 2, 23.75; grade 3, 22.75; grade 4, 22.25.

Brass Ingot: Red brass, No. 115, 29.25; tin bronze, No. 225, 39.50; No. 245, 34.00; high-leaded tin bronze, No. 305, 33.75; No. 1 yellow, No. 405, 23.75; manganese bronze, No. 421, 28.25.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.25; AZ91C, 41.25; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.975, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.955, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 20,000-lb lots, 38.35; l.c.l., 38.98. Weatherproof, 20,000-lb lots, 38.55; l.c.l., 39.30.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $17.50 per cwt; pipe, full coils, $17.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheet and strip, $6.75-15.50; sheared mill plate, $5.25-9.00; wire, $5.55-9.50; forging billets, $3.20-4.75; hot-rolled and forged bars, $3.80-6.25.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 28.00; ribbon zinc in coils, 22.50; plates, 21.50.

ZIRCONIUM

Plate, $14.00-25.00; H.R. strip, $12.50-22.90; C.R. strip, $15.90-31.25; forged or H.R. bars, $11.00-17.40.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	138	120	138
Strip, C.R.	124	108	138
Plate, H.R.	130	110	126
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

(Selected products and sizes)

Flat Sheets: 1100, 3003, and 5005, mill finish, 30,000 lb base f.o.b. customer custody.

Thickness Range (in.)	Width (in.)	Length Range (in.)	Price Range
0.250-0.136	24-72	72-180	45.10-47.70
0.136-0.096	24-72	72-180	45.50-48.70
0.096-0.077	24-72	72-180	46.20-50.00
0.077-0.068	24-72	72-180	46.70-51.70
0.068-0.061	24-72	72-180	46.70-55.50
0.061-0.048	24-72	72-180	47.30-57.30
0.048-0.038	24-72	72-180	47.80-60.20
0.038-0.030	24-72	72-180	48.20-65.30
0.030-0.024	24-60	72-180	48.70-56.60
0.024-0.019	24-60	72-180	49.40-59.90
0.019-0.017	24-48	72-144	50.30-57.00
0.017-0.015	24-48	72-144	51.20-58.00
0.015-0.014	24-36	72-144	52.30
0.014-0.012	24-36	72-144	53.50
0.012-0.011	24-36	72-144	54.60
0.011-0.0095	24-36	72-144	56.20
0.0095-0.0085	24-36	72-96	57.50
0.0085-0.0075	24-36	72-96	59.20
0.0075-0.007	24-36	72-96	60.80
0.007-0.006	24-36	72-96	62.50

ALUMINUM (continued)

Plates and Circles: Thickness, 0.25-3 in.; width or diam., 24-60 in.; lengths, 72-240 in., mill finish.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	44.60	49.40
5050-F	45.70	50.50
3004-F	46.70	52.40
5052-F	47.30	53.10
6061-T6	47.80	53.90
2024-T4	51.80	58.90
7075 T6*	60.50	67.90

*24-48 in. width or diam., 72-180 in. lengths.

Screw Machine Stock: 30,000 lb base, 12 ft

Diam.	Round		Hexagonal	
(in.)*	2011-T3	2017-T4	2011-T3	2017-T4
0.125	72.90	75.80	....	....
0.188	....	....	....	78.20
0.250	58.00	61.60	70.70	72.30
0.375	57.20	62.40	69.00	70.50
	2011-T3	2017-T451	2011-T3	2017-T451
0.500	57.20	62.40	69.00	70.50
0.625	57.20	62.40	65.80	66.60
0.750	55.70	60.70	59.60	62.60
0.875	55.70	60.70	59.60	62.60
1.000	55.70	60.70	59.60	62.60
1.125	53.30	58.30	57.50	60.40
1.250	53.30	58.30	57.50	60.40
1.375	53.30	58.30	57.50	60.40
1.500	53.30	58.30	57.50	60.40
1.625	51.00	55.60	....	58.20
1.750	51.00	55.60	56.30	58.20
1.875	51.00	55.60	....	58.20
2.000	51.00	55.60	56.30	58.20
2.250	49.50	54.00	....	58.20
2.500	49.50	54.00	....	58.20
2.750	47.90	52.20	....	58.20
3.000	47.90	52.20	....	58.20
3.250	....	52.20	....	....
3.375	....	52.20	....	....

*Selected sizes.

Forging Stock: Round, Class 1, random lengths, diam., 0.375-8 in., "F" temper; 2014, 47.20-56.90; 6061, 43.20-56.90; 7075, 61.50-71.20; 7079, 66.50-76.20.

Pipe: ASA schedule 40, alloy 6063-T6, 3-40 ft lengths, plain ends, 90,000 lb base, dollars per ft. Nominal pipe sizes: 1 in., 31.55; 1¼ in., 42.75; 1½ in., 51.05; 2 in., 61.70; 3 in., 123.40; 4 in., 169.55; 5 in., 229.60; 6 in., 304.60; 8 in., 458.40; 10 in., 706.45 (3-24 ft lengths).

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
1-14	44.70-46.20	53.20-59.00
15-17	44.70-46.20	55.60-60.80
18-23	45.20-46.80	57.70-66.40
24-32	45.20-46.80	65.60-78.80
33-38	48.80-51.40	82.30-93.40
39-44	58.70-62.40	99.90-121.00

MAGNESIUM

Sheets and Plates: AZ31B standard grade, .032 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.00 in., 67.90. AZ31B spec. grades, .032 in., 171.30; .081 in., 108.80; .125 in., 98.10; .188 in., 95.70; .250-2.00 in., 93.30. Tread plate, 60-192 in. lengths, 24.72 in. widths; .125 in., 74.90; .188 in., 71.70-72.70; .25-.75 in., 70.60-71.60. Tooling plate, 0.25-3.00 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	65.30-67.60	94.60-87.40
12-14	65.30-67.60	85.70-88.00
24-26	66.10-68.40	90.60-91.30
36-38	71.50-75.30	104.20-105.30

NONFERROUS SCRAP

DEALERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 23.00-23.50; No. 2 heavy copper and wire, 20.00-20.50; light copper, 18.00-18.50; No. 1 composition red brass, 17.00-17.25; No. 1 com-

BRASS MILL PRICES

MILL PRODUCTS a

	Sheet, Strip, Plate	Rod	Wire	Seamless Tubes	SCRAP ALLOWANCES e (Based on copper at 30.00c) Clean Heavy	Rod Ends	Clean Turnings
Copper	50.00b	54.86c	....	58.32	29.000	29.000	28.250
Yellow Brass	50.57	36.06d	50.86	54.23	22.250	21.250	20.250
Low Brass, 80%	53.53	53.22	53.82	57.09	24.750	24.500	24.000
Red Brass, 85%	54.58	54.27	54.87	58.14	25.750	25.500	25.000
Com. Bronze, 90%	56.17	55.86	56.46	59.48	26.750	26.500	26.000
Manganese Bronze	58.86	52.21	62.69	....	20.875	26.625	19.875
Muntz Metal	53.20	48.26	....	....	20.875	20.625	20.125
Naval Brass	55.12	48.68	61.43	58.78	20.750	20.500	20.000
Silicon Bronze	62.86	61.80	62.15	80.79	28.375	28.125	27.375
Nickel Silver, 10%	65.98	68.06	68.06	....	26.875	26.625	14.937
Phos. Bronze	77.44	78.19	77.69	79.37	29.875	29.625	28.625

a. Cents per lb, f.o.b. mill; freight allowed on 50 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb.

position turnings, 15.50-15.75; new brass clippings, 14.00-14.50; light brass, 10.50-10.75; heavy yellow brass, 11.50-11.75; new brass rod ends, 12.50-12.75; auto radiators, unsweated, 12.50-12.75; cocks and faucets, 13.50-14.00; brass pipe, 14.00-14.50.

Lead: Soft scrap lead; 8.00-8.25; battery plates, 3.00-3.25; linotype and stereotype, 9.00-9.50; electrotype, 8.00-8.25; mixed babbitt, 9.50-10.00.

Monel: Clippings, 23.00-24.00; old sheets, 22.00-23.00; turnings, 16.50-17.50; rods, 22.00-23.00.

Nickel: Sheets and clips, 50.00-51.00; rolled anodes, 50.00-51.00; turnings, 39.00-41.00; rod ends, 50.00-51.00.

Zinc: Old zinc, 3.00-3.50; new diecast scrap, 4.25-4.50; old diecast scrap, 2.75-3.00.

Aluminum: Old castings and sheets, 10.50-11.00; clean borings and turnings, 6.50-7.00; segregated low copper clips, 14.00-14.50; segregated high copper clips, 13.00-13.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 12.00-12.50.

(Cents per pound, Chicago)

Aluminum: Old castings and sheets, 11.50-12.00; clean borings and turnings, 8.00-8.50; segregated low copper clips, 16.00-16.50; segregated high copper clips, 14.50-15.00; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

(Cents per pound, Cleveland)

Aluminum: Old castings and sheets, 11.00-11.25; clean borings and turnings, 9.50-10.00; segregated low copper clips, 14.75-15.00; segregated high copper clips, 14.00-14.50; mixed low copper clips, 14.00-14.50; mixed high copper clips, 13.50-14.00.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 59.00; light scrap, 54.00; turnings and borings, 39.00.

Copper and Brass: No. 1 heavy copper and wire, 27.75; No. 2 heavy copper and wire, 25.50; light copper, 23.25; refinery brass (60% copper) dry copper content, 23.50.

INGOTMAKERS' BUYING PRICES

Copper and Brass: No. 1 heavy copper and wire, 27.75; No. 2 heavy copper and wire, 25.50; light copper, 23.25; No. 1 composition borings, 21.00; No. 1 composition solids, 21.50; heavy yellow brass solids, 17.50; yellow brass turnings, 16.50; radiators, 17.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.50.
Copper: Flat-rolled, 50.04; oval, 46.50, 5000-10,000 lb, electrodeposited, 42.00, 2000-5000 lb lots; cast, 44.50, 5000-10,000 lb quantities.
Nickel: Depolarized, less than 1000 lb, 114.25; 100-499 lb, 112.00; 500-4999 lb, 107.50; 5000-29,999 lb, 105.25; 30,000 lb, 103.00. Carbonized, deduct 3 cents a lb.
Tin: Bar or slab, less than 200 lb, 123.50; 200-499 lb, 122.00; 500-999 lb, 121.50; 1000 lb or more, 121.00.
Zinc: Balls, 20.50; flat tops, 20.50; flats, 23.25; ovals, 22.50, ton lots.

CHEMICALS

Cadmium Oxide: $1.50 per lb in 100-lb drums.
Chromic Acid (flake): 100-2000 lb, 31.00; 2000-10,000 lb, 30.50; 10,000-20,000 lb, 30.00; 20,000 lb or more, 29.50.
Copper Cyanide: 100-200 lb, 65.90; 300-900 lb, 63.00; 1000-19,000 lb, 61.90.
Copper Sulphate: 100-1900 lb, 16.00; 2000-5900 lb, 14.00; 6000-11,900 lb, 13.75; 12,000-22,900 lb, 13.50; 23,000 lb or more, 13.00.
Nickel Chloride: 100 lb, 45.00; 200 lb, 43.00; 300 lb, 42.00; 400-4900 lb, 40.00; 5000-9900 lb, 38.00; 10,000 lb or more, 37.00.
Nickel Sulphate: 5000-22,999 lb, 29.00; 23,000-39,900 lb, 28.50; 40,000 lb or more, 28.00.
Sodium Cyanide (Cyanobrik): 200 lb, 23.80; 400-800 lb, 20.80; 1000-4900 lb, 19.80; 5000-19,900 lb, 18.80; 20,000 lb or more, 17.60.
Sodium Stannate: Less than 100 lb, 81.20; 100-600 lb, 71.70; 700-1900 lb, 69.00; 2000-9900 lb, 67.10; 10,000 lb or more, 65.80.
Stannous Chloride (Anhydrous): 25 lb, 156.80; 100 lb, 152.00; 400 lb, 149.50; 800-19,900 lb, 108.70; 20,000 lb or more, 102.60.
Stannous Sulphate: Less than 50 lb, 141.90; 50 lb, 111.90; 100-1900 lb, 109.90; 2000 lb or more, 107.90.
Zinc Cyanide: 100-200 lb, 59.00; 300-900 lb, 57.00.

(*Concluded from Page 141*)

activity in No. 2 bundles, both for the domestic and export markets.

At New Orleans and Baton Rouge, La., $36 a gross ton was paid for No. 1 heavy melting, delivered to port. The price for No. 2 steel was $32 a gross ton.

Prices in Houston went to $34 for No. 1 heavy melting and $29 a ton for No. 2 on the export market. ($29 is in line with what was paid by a local mill.)

Not much scrap is available in the Houston area.

• **Los Angeles**—Local mills have ceased buying. Export sales continue heavy. Dealers hope for an upturn in the local market by the first of September.

• **San Francisco**—The little scrap that's moving is going at steady prices. There has been no real test of the market recently because of the slowness of demand.

Use of Purchased Scrap Drops 184,000 Tons in May

The depressed steel operating rate has affected the scrap market as shown by an 8 per cent reduction in consumption of purchased iron and steel scrap in May compared with the April level, says the Institute of Scrap Iron & Steel Inc., Washington.

May consumption is estimated at 2,002,000 gross tons compared with 2,186,000 tons in April and 2,672,000 tons in May, 1959.

Purchased scrap receipts for May declined slightly to 2,075,000 tons compared with 2,183,000 tons in April.

Exports of iron and steel scrap in May were 591,312 tons, up substantially compared with 459,000 tons exported in April. This sizable increase in exports gave a firm tone to an otherwise dull scrap market.

The institute points out a significant statistic: Scrap receipts and purchase scrap production in the first five months totaled 30,401,205 tons while total scrap consumption during the period was 30,869,332 tons. This was an excess of consumption over production and receipts of 468,127 tons.

Iron Ore . . .

Iron Ore Prices, Page 137

Edward L. Ryerson has joined Inland Steel's fleet, augmenting the per trip capacity of the company's vessels 36 per cent. With a maximum capacity of 26,600 tons and a top speed loaded of 16.5 mph, the vessel is expected to carry more than 1 million tons of iron ore a year in the long runs between Lake Superior ports and Indiana Harbor, Ind.

Hatches are 20 ft wide, double the width of older ships. They accommodate two loading chutes at a time. Other unique features include straight cargo holds to reduce damage from banging by unloading buckets, a five bladed stainless steel propeller that's 20 ft in diameter, and hydraulic combustion controls for the boilers generating steam for the turbines.

Pig Iron . . .

Pig Iron Prices, Page 136

Sellers of merchant foundry iron look for a slight increase in busi-

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Call collect: GL 3-6783
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DESIGNERS

Permanent positions with Arthur G. McKee & Company at their Cleveland offices for **ENGINEERS, DESIGNERS, DRAFTSMEN** who are experienced in any type of Steel Plant or Steel Plant Equipment design. Applications will be kept confidential.

Send detailed resume and photo to:

G. VICTOR HOPKINS
ARTHUR G. McKEE & COMPANY
2300 Chester Ave. Cleveland 1, Ohio

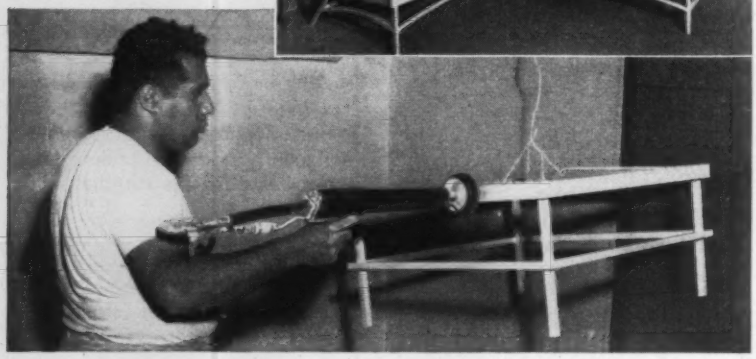
WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind.
Readers of STEEL include men of wide training and experience in the various branches of the metalworking industry.
When you have an opportunity to offer, use the Help Wanted columns of STEEL.

What Would

75% PAINT SAVINGS

Mean in YOUR Finishing Department?

Designed for the New Decade—Beautifully styled BAL HARBOUR line of aluminum furniture by AFCO was winner of the 1960 Apollo Award for pre-eminence in design. The uniform, high quality finish is applied electrostatically with the Ransburg No. 2 Process Hand Gun.



Faster . . . Cleaner . . . Cheaper—The "wrap-around" feature of the No. 2 Process Electrostatic Hand Gun paints all areas of this type of work from one side only, providing a 75% paint savings and a 700% increase in production volume over former air hand spray.

RANSBURG

Ransburg No. 2 Process Electrostatic Hand Guns are providing a 75% paint savings in the painting of beautiful AFCO aluminum furniture.

AFCO Aluminum Furniture Co., Inc., Miami, Fla., replaced hand spray with two Ransburg Electrostatic Hand Guns. Along with paint and labor savings, quality of the work was improved with greater uniformity. And, production volume was increased a healthy 700%! Formerly, they were painting approximately 100 items a day. NOW, with the faster, cleaner Electrostatic Hand Guns, they paint from 700 to 800 pieces per day. Electrostatic is faster because the "wrap-around" characteristic of Electro-Spray paints all areas of this type of work with a pass from one side only.

NO REASON WHY YOU CAN'T DO IT TOO

Write for information and literature about this revolutionary, new painting tool. See how the Ransburg Electrostatic Hand Gun can save time . . . paint . . . and cut costs in YOUR finishing department. If your production justifies, it'll pay you to investigate Ransburg's *automatic* electrostatic spray painting equipment. Write for our No. 2 Process brochures which show numerous examples of modern production painting in both large and small plants.

RANSBURG Electro-Coating Corp.

Box 23122, Indianapolis 23, Indiana

ness this month, following what many believe will have been the year's low point in July.

Supplies are heavy despite a widespread curtailment of production. On the Eastern Seaboard, for instance, producers have shut down every merchant stack.

In the Chicago district, only 21 blast furnaces out of a total of 43 are operating. Excluding the 1959 steel strike period, it's the smallest number since April, 1958. U. S. Steel has banked its No. 12 furnace at South Works for two weeks starting July 30 while the plant foundry is down for vacation. The corporation also closed the Ensley (Ala.) Works of its Tennessee Coal & Iron Div. on Aug. 6 for an indefinite period because of lack of orders for rails and other products.

Blast Furnace Output Continues to Decline

Blast furnace production (pig iron and ferroalloys) dropped to 5,309,487 tons in June from 6,394,411 tons in May, reports the American Iron & Steel Institute. Of total production, ferromanganese and spiegeleisen accounted for 48,316 tons in June and 63,419 tons in May.

Production in the first six months this year totaled 41,574,223 tons, including 409,191 tons of ferromanganese and spiegeleisen. In the like period a year ago, output amounted to 42,393,666 tons, including 318,923 tons of ferromanganese and spiegeleisen. The breakdown by states:

Blast Furnace Production
(Net tons)

	June	—First Six Months— 1960	1959
Massachusetts, New York	310,129	2,724,321	2,669,287
Pennsylvania	1,283,959	11,003,369	11,112,395
Maryland, Virginia, W. Virginia	540,802	3,765,245	3,676,480
Kentucky, Tennessee, Texas	156,966	1,000,168	940,755
Alabama	285,872	2,104,412	2,459,442
Ohio	897,331	7,693,868	8,065,383
Indiana	688,962	4,950,697	4,923,833
Illinois	391,069	3,438,031	3,580,816
Michigan, Minnesota	456,701	2,826,653	2,685,208
Colorado, Utah, Califonia	297,696	2,067,459	2,280,067
Totals	5,309,487*	41,574,223†	42,393,666‡

Includes ferromangenese and spiegeleisen: *48,316; †409,191; ‡318,923 tons.

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to serve you

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In heart of metal working industry.
Seven large truck line terminals.
New York Central and
Pennsylvania Railroads.

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Convenient to Birmingham.
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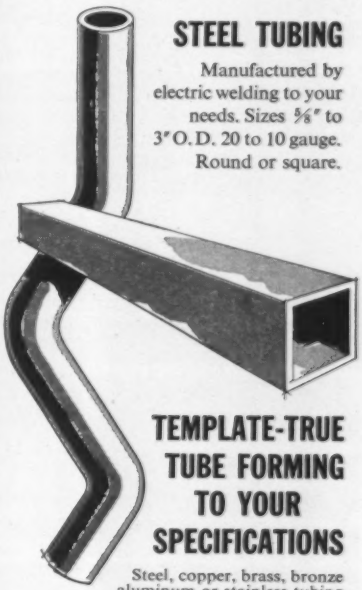

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Manufactured by electric welding to your needs. Sizes ⅝" to 3" O. D. 20 to 10 gauge. Round or square.

TEMPLATE-TRUE TUBE FORMING TO YOUR SPECIFICATIONS

Steel, copper, brass, bronze aluminum or stainless tubing fabricated to your specifications. Sizes ⅜" to 6" OD, 20 to 10 gauge.

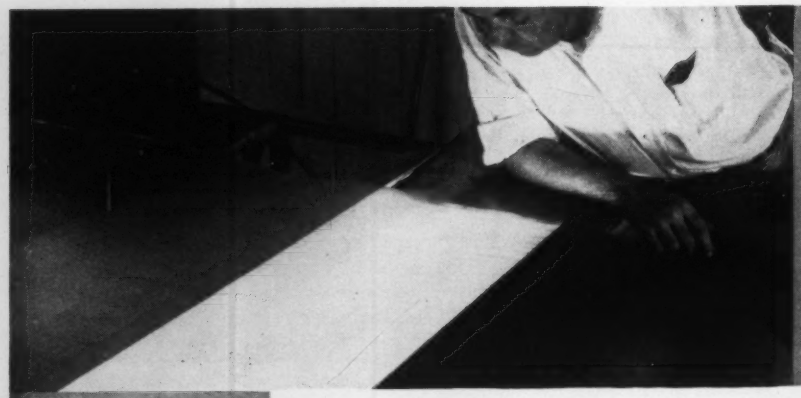
Thirty-four years of experience in forming, welding, beading, bending, stamping of formed tubes.

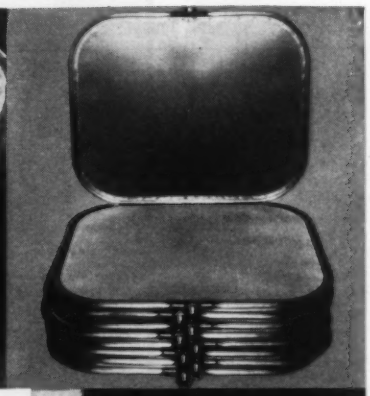
Top-flight engineering service.

Write, wire or phone for booklet or quotation.

Formed Tubes, Inc.
804 Prairie Street, Sturgis, Michigan

Formed Tubes, INC.





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CAMBRIDGE does . . .

To assure you of wire cloth fabrications that give long and satisfactory performance, we have experienced engineers who can draw up prints for your approval if necessary, and trained production men who can quickly and accurately fabricate parts to your most rigid specifications.

To fill your most diversified bulk wire cloth needs, we have thousands of items in stock—in all meshes, wire sizes, metals or alloys—ready for prompt delivery.

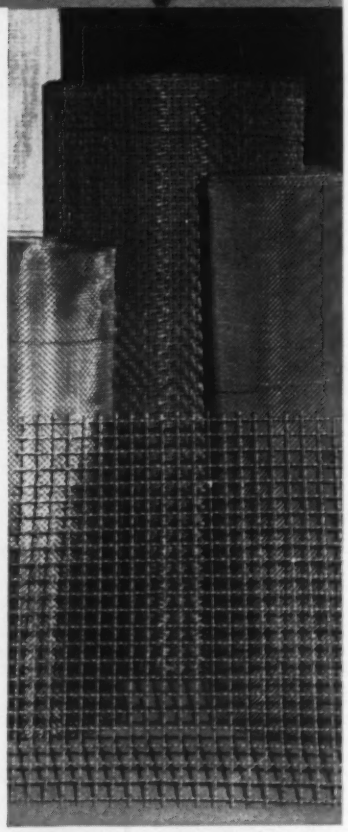
Modern machinery, careful workmanship and constant inspection assure you of exact mesh count and mesh size. And, our field engineers follow up your order to see that our product is giving the best possible service.

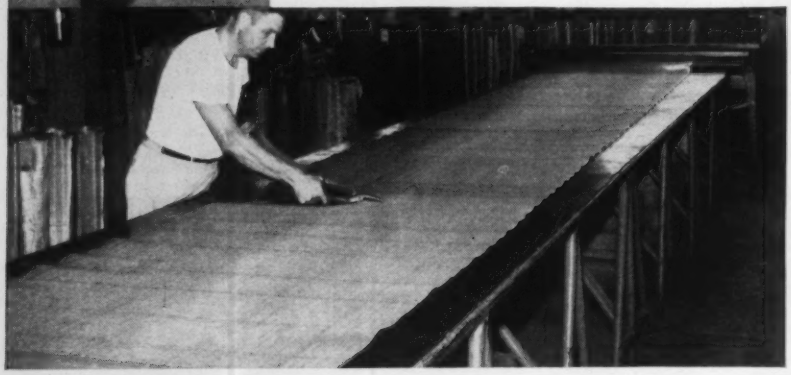
We make wire cloth from any metal or alloy—including titanium—in nine basic weaves—from finest to coarsest mesh. Call your Cambridge Field Engineer for information. He's listed in the yellow pages under "Wire Cloth". Or, write for FREE 94-PAGE CATALOG.

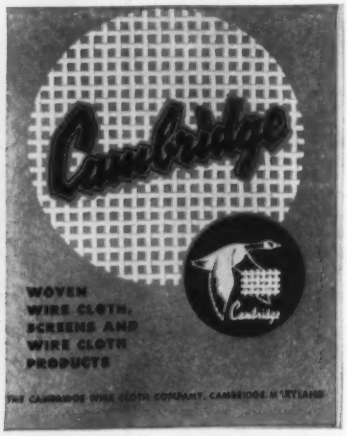
The Cambridge Wire Cloth Co.

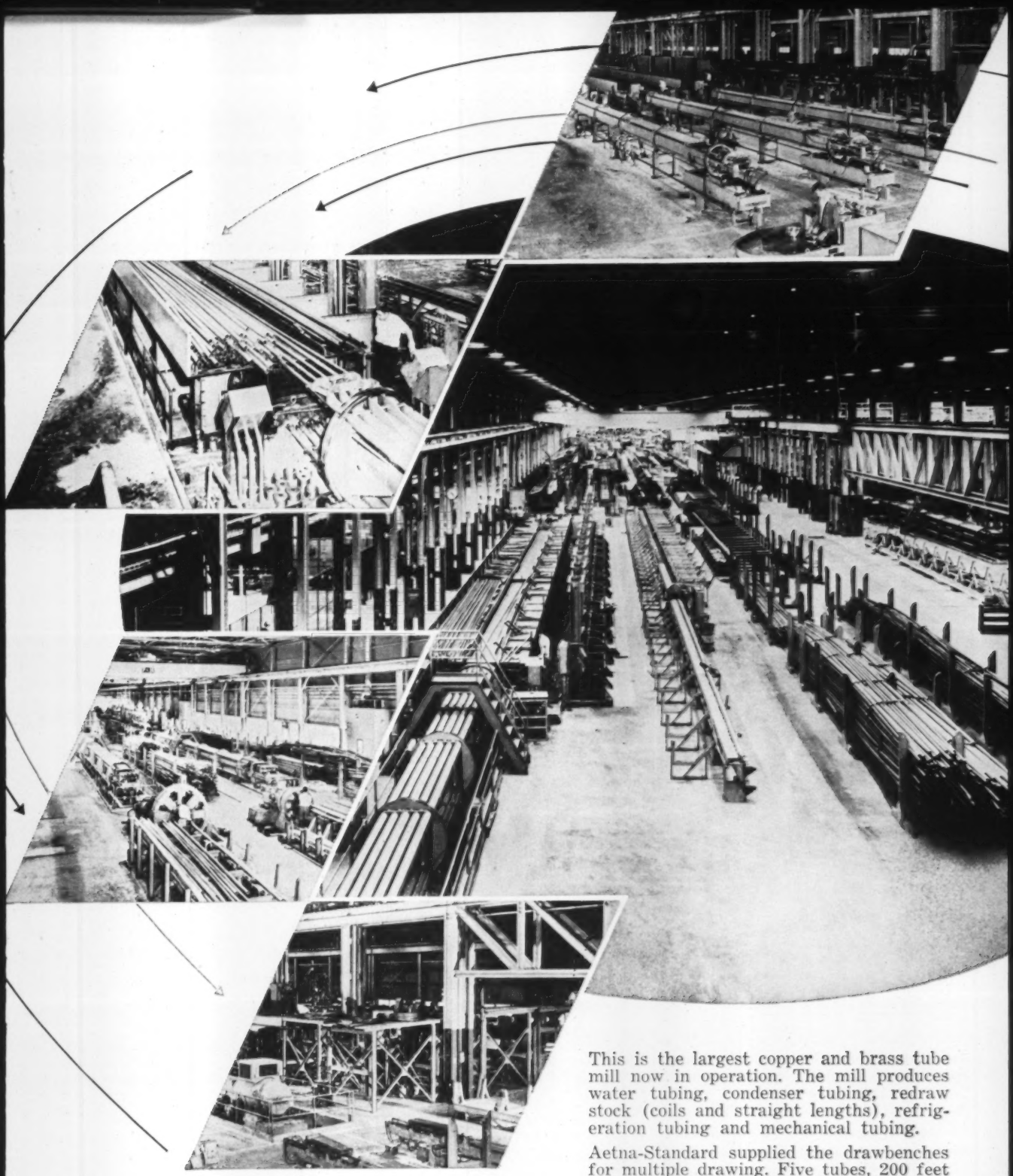
Department J • Cambridge 8, Md.

Manufacturers of Wire Cloth, Metal-Mesh Conveyor Belts, Wire Cloth Fabrications









BRASS and COPPER TUBE MILL...

This is the largest copper and brass tube mill now in operation. The mill produces water tubing, condenser tubing, redraw stock (coils and straight lengths), refrigeration tubing and mechanical tubing.

Aetna-Standard supplied the drawbenches for multiple drawing. Five tubes, 200 feet in length, are drawn in a single pass. Aetna-Standard also supplied high speed 60-inch Bull Blocks with turn-style coil handling.

For information on Cold Draw equipment, write to: Aetna-Standard Division
300 Sixth Avenue
Pittsburgh, Pennsylvania

Aetna-Standard Division

BLAW-KNOX

Archaic Taxation is Forcing Industry to use Museum Pieces

● The machine tool below is now in the Ford Museum—where it belongs. And although you're hardly apt to find machines as antique as this in industry, the degree of obsolescence in American industry is of dangerous proportions.

While the tax laws of most industrialized nations encourage investment in modern machinery, the tax policies in this country discourage such productive investment.

The consequences are everywhere to behold. The productivity of American industry is being impaired. Countries whose governments offer incentives to modernize are gaining in world markets—at our expense.

Legislation is now being considered which will remove these shackles from our industry. Its purpose is to allow more realistic depreciation, thereby making it possible for industry to buy the machine tools it needs without hurting profit.

Show your employees how up-to-date depreciation makes their jobs more secure. Modern depreciation allowances mean more job security for all employees —yours and ours, a better chance for both of us to compete at home and abroad and faster economic growth for our country.

The Timken Roller Bearing Company

Canton 6, Ohio